Book of Proceedings

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A BRIEFING ON RISK BASED CAPITAL ACCORDS FOR SMALL ACCOUNTING FIRMS: AUDIT PERSPECTIVES FOR COMMUNITY BANKING INSTITUTIONS

Oral

Dr. Stan Vinson (deceased) [1], ***Dr. Michael Brizek*** [1]

1. *Lander University*

This paper examines the rapidly changing global banking system and the Basel Committee attempt to implement a regulatory framework for the international banking business. Established in 1974 the Basel Committee on Banking Supervision (BASEL) has since issued three major publications known as BASEL 1 (1988), BASEL II (2004) and BASEL III (2009) which are focused on managing and establishing minimums for the risk based capital accounts in Banks that operate globally. The research looks at the challenges and benefits of the rules based approach used by Basel vs. the principle-based decision making used by many regulators in countries around the world.

A Case Study in Medicare Fraud Suitable for University Courses Related to Ethics, Internal Controls, Fraud, Auditing

Oral

Dr. Kelli Horne [1]***, Dr. Gail Moore*** [1]

***1.** Lander University*

In October of 1996, a home health care organization and its purchaser agreed to reimburse the federal government $255 million for overbilling and making fraudulent Medicare claims. Under the agreement, First American Health Care of Georgia, Inc., the nation's largest home health care provider, and its new owner, Integrated Health Services, Inc, agreed to reimburse the federal government for money stolen from Medicare through fraudulent billing practices. The alleged fraud was that First American billed Medicare for costs unrelated to the care of patients in their homes, including the personal expenses of First American's senior management, as well as for the company's marketing and lobbying expenses. In a related criminal action, the company's two major principals, Jack and Margie Mills, were found guilty of defrauding Medicare, and were sentenced to prison terms of 90 months and 32 months, respectively, for their participation in the fraud. This case is applicable to a university course related to fraud, ethics, auditing, internal controls, etc.

A Comparison Study to Analyze the Data Acquisitions of iOS and Android Smartphones Using Multiple Forensic Tools

Oral

Ms. Katrina Khanta [1], ***Dr. Faleh Alshameri*** [1], ***Dr. Stephen Boyce*** [1]

1. *Marymount University*

Nowadays, most people carry their smartphone with them wherever they go, and it has become one of the primary necessities to not leave your home without. Because of the ever-growing rise in smartphone usage, we store a majority of our personal information into these handheld devices as they have evolved into an extension of ourselves. Additionally, it is critical to acknowledge how multiple mobile applications are connected to cloud storage. The purpose of this study is to emphasize the significance of data remanence pertaining to mobile devices and how forensic data acquisitions from mobile phones prove as high value evidence in legal cases. We conducted an experimental methodology using various data acquisition tools, such as Magnet AXIOM, Oxygen Forensic Detective, and Belkasoft X to extract data from previously used smartphone devices purchased from an eCommerce website. The study provides a comparison analysis between the data acquisition tools and the following smartphones: Apple iPhone 8, Samsung S9+, and Google Pixel 3, to determine which tools are more effective at extracting a specific range of deleted datasets.

A Comprehensive Review: Themes of Motivational Literature

Undergraduate Student Poster

Ms. Sydney Wagner [1], *Dr. Johanna Sweet* [1]

1. Roanoke College

Many of the seminal motivational theories studied today were written decades ago, with new theories also building on their original concepts. However, there are no prominent modern motivational theories that include a comprehensive integration of key concepts. This comprehensive literature review aims to establish the common themes among motivational theories in order to isolate the important principles. The findings of this literature review have revealed multiple key concepts. This study is significant for organizational behavior and human resources as it provides an understanding of core ideas that should be applied with management and workers. Future research will develop a comprehensive theory based on the core concepts incentivized in this literature review.

Key words: motivation, human resources, motivational theories, organizational behavior

A Digital Reckoning: How COVID-19 has forced Universities to Adapt their Technological Infrastructure

Oral

Dr. Constance Lightner [1], ***Dr. Carin Lightner-Laws*** [2], ***Dr. Tameka Womack*** [2]

1. *Fayetteville State University,* ***2.*** *Clayton State University*

The COVID-19 pandemic exposed glaring deficiencies in digital technology throughout the educational spectrum. It also revealed that a simple, piecemeal, reactive solution would not sufficiently mitigate future school closures due to natural disasters, pandemics, or other unforeseen events. In this paper, we discuss existing challenges in academia that were magnified during the onset of the pandemic, best practices, and possible ways of minimizing potential issues by improving the digital infrastructure of an institution. The term digital infrastructure in the context of this paper goes well beyond teaching online classes. The digital infrastructure includes: learning platforms, online teaching/learning, training (for administrators, faculty, and students) about technology, billing for distance education, access to laptops/internet, virtual engagement and communications, virtual student activities and service opportunities, online support for virtual learning platforms, quality matters online course development, digital resources to aid research and student learning, and resources to promote active participation in virtual student activities. Most importantly, we highlight issues and suggest practical changes that would have a lasting impact on a school's financial, technological, teaching, learning, research, and administrative capabilities.

A Panel Discussion on Student Persistence During the 2020 Covid-19 Pandemic

Panel

***Dr. Michael Latta* [1], Dr. Mark Mitchell [1], Dr. Bomi Kang [1], Dr. Jennifer Calhoun [1], Prof. Heather Carle [1]**

***1.** Coastal Carolina University*

Michael Latta: Impact of Student Persistence on Grades During the 2020 Covid-19 Pandemic

Persistence is often studied as an outcome instead of a predictor, probably because of its believed connection to student retention. Student persistence in college can be measured in a course by using the Short Grit Scale (Grit-S) which measures trait level persistence in a two-factor approach. These two factors are defined below:

Consistency of Interest

- New ideas and projects sometimes distract me from previous ones.
- I often set a goal but later choose to pursue a different one.
- I have difficulty maintaining my focus on projects that take more than a few months to complete.

- My interests change from year to year.
- I have been obsessed with a certain idea or project for a short time but later lost interest.

Perseverance of Effort

- Setbacks don't discourage me. I don't give up easily.
- I am a hard worker.
- I finish whatever I begin.
- I am diligent. I never give up.
- I have overcome setbacks to conquer an important challenge.

Duckworth, A. L. & Quinn, P. D. (2009). Development and Validation of the Short Grit Scale (Grit-S). *Journal of Personality Assessment*, 91(2), 166-174.

Data for persistence and grade came from 48 male and 41 female students in the 2020 WinterMester and Fall Semester classes Decision Analysis, Advertising, and Marketing Strategy. Stepwise Regression using the Grit Scale items and gender to predict Grade showed 'I am a hard worker.' ($p < .001$) and Gender ($p < .05$) as significant predictors of Student Persistence.

Jennifer Calhoun: Persistence from the Point of View of Senior Business Students in a Distance Learning Class

The flexibility of online learning provides an opportunity for adult learners to attend classes given their busy schedules. Students who were persistent were inclined to be more self-motivated, hopeful of the future, and responded more readily to a positive online learning environment.

Bomi Kang: Implicit Theories of Intelligence and Persistence

This study examined the relationship between students' adoption of technology and its antecedents and consequences. Applying Implicit Theories of Intelligence (ITI), the authors examined Incremental and Entity support as determinants of achievement and intention to stay in a course. Implicit Theories of Intelligence Scales for Academic Achievement was modified and operationalized to measure students' attitudes and adoptability. Data were collected from business majors located in the southeast of the United States. Using structural equation modeling, the researchers examined the path relationship of intelligence, technology adoption, anxiety, self-efficacy, intention to stay, and academic achievement. This presentation reports the results of principal components analysis, and alternative structural equation models, and the implication for teachers, administrators, program coordinators, and students.

Mark Mitchell: COVID Pandemic and Student Persistence a Personal Statement from a Parent/Faculty Member

Time and time again, we educators talk about the need for organizations to adapt and adjust to changing market conditions. The COVID-19 global pandemic required all of us, as individuals, to follow this advice. I am the parent of 3 college students. At home, we talked about my children's professional goals and their planned timeline for reaching them. Stay on task, stay on target. Don't get distracted. Position yourself for success in this new reality. I just tried to bring the same discussion to my own students at my university. I spent more time on encouragement, updates, and outreach to make sure my students were doing well both in the classroom and as young people living through a strange time for us all. Like all parents, I want my children to succeed. I also want my students to succeed. I hope that commitment shined through as we navigate(d) COVID Land. It really is a privilege to be in a position to help young people reach their goals and position themselves for the next phase of their lives. I love my job.

Heather Carle: Helping MBA Students Persist During the COVID Pandemic

We know from the research that a student's own level of self-efficacy contributes to emotional engagement and student achievement over time. As faculty members helping students navigate this disruptive time of COVID, decisions on lecture and assignment design for the online format to reduce social isolation were important, as was the design of course pacing and the selection of technology to be used to facilitate active learning, communication, and collaboration. The risk however is that a lack of familiarity with these tools and online formats creates an even greater additional time and cognitive burden that may place a drag on time available to complete assignments and therefore performance, despite the best efforts of the faculty member.

Adolescent Sexual Victimization: The Economics of Calculating Earnings Capacity Losses

Oral

Prof. Craig Galbraith [1], ***Prof. Curt Stiles*** [1]

1. *University of North Carolina Wilmington*

Forensic economists are often asked to calculate the loss of future earnings capacity of adolescents and children. This is an important issue in a variety of legal situations, such as the death or injury to an adolescent, or in various cases where children, adolescents and teenagers have been victimized. Since victims in these age groups have not established careers or long-term income records, forecasting the long-term impact on earnings is particularly difficult. This paper examines one possible approach for examining this issue, the use of the Work Ability Index (WAI) and Work Ability Scale (WAS). In this pilot study, empirical data is analyzed to determine the relationship between scores on the WAI/WAS and future income loss. We then examine how this could be applied to adolescent victimization cases.

AMERICAN FACTORY: USING THE NETFLIX DOCUMENTARY TO TEACH INTERNATIONAL MANAGEMENT

Oral

Dr. Suzie Smith [1]

1. *Presbyterian College*

Fuyao Glass America (FGA) in Dayton, Ohio, is a Chinese-owned factory that makes automotive glass in a facility formerly owned by General Motors. The documentary follows the managers and key employees from the US and China starting in 2016. The film highlights cross-cultural challenges between the Chinese and American styles and expectations and also follows the attempt to unionize American employees. The 115 minute film has a 96% rating on Rotten Tomatoes website. This presentation will demonstrate examples of assignments that can follow this film in an introductory management class.

AN EXPLORATORY STUDY OF BUSINESS STUDENT PREFERENCES TOWARD TRADITIONAL, HYBRID, AND ONLINE INSTRUCTION METHODS: PRE AND POST COVID-19

Oral

Dr. Susan Shurden [1], *Dr. Mike Shurden* [1], *Dr. Tim DuPont* [2]

1. Lander University, 2. Newberry College

This exploratory research paper addresses undergraduate business student course instruction method preferences both pre and post COVID-19. A survey was given to a convenience sample of undergraduate business students across four areas of business: Accounting, Financial Services, Marketing/Management, and Health Care at a small university in the southeastern United States in spring 2019 (N=246) and again in spring 2021 (N=103). The purpose of the survey is to identify undergraduate business student preferences for both pre-Covid (spring 2019) and post-Covid (spring 2021) regarding Online, Hybrid, and Traditional (face-to-face) classes. The findings of this study show student preferences for the three types of delivery, as well as the change in preferences between spring 2019 and spring 2021. Future recommendations for study include an expanded study across disciplines and emphases. A qualitative investigation into the reasons for student survey responses is also suggested.

Analysis of Product Distribution with Multiple Roles of the Supplier

Oral

Dr. Zhaoqiong Qin [1]

1. Savannah State University

This study aims to investigate the product distribution under channel competition. Based on the channel differentiation, past work related to the product distribution through different channels and channel competition are extensively reviewed. In this study, the supplier is not only the owner of the online channel (direct channel) but also the supplier and competitor of the physical channel. A mathematical model is formulated to seek the maximization of the supplier's profit. The study shows the conditions for the product to be distributed either through the online channel, physical channel or both.

Keywords: Product distribution; Direct channel; Physical channel; Channel competition

ARMA-GARCH Model with Fractional Generalized Hyperbolic Innovation

Oral

Dr. Sung Ik Kim [1]

1. *Louisiana State University Shreveport*

In this study, a multivariate ARMA-GARCH model with fractional generalized hyperbolic innovations exhibiting fat-tail, volatility clustering, and long-range dependence property is introduced. To define the fractional generalized hyperbolic process, the non-fractional generalized hyperbolic process is derived by subordinating time-changed Brownian motion to generalized inverse Gaussian process, and then the fractional generalized hyperbolic process is obtained using the Voltera kernel. Based on the new ARMA-GARCH model, the parameters are estimated for high frequency returns for six U.S. stocks, and such a model is compared with two ARMA-GARCH models with non-fractional generalized hyperbolic and normal innovations. The results show that the fractional generalized hyperbolic process has better performance in describing the behavior of the residual process of high frequency returns than the non-fractional processes considered in this study.

AUDIT CONCERNS AND ADJUSTMENTS NEEDED TO ADDRESS REVERSE FACTORING

Oral

Dr. Leisa Marshall [1]***, Dr. Richard Palmer*** [2]

1. Southeast Missouri State University, 2. Washington University in St. Louis

The purpose of this paper is to address reverse factoring (RF), as recently posed by the Big 4 and Moody's Investor Services to the Financial Accounting Standards Board and the International Accounting Standards Board, respectively. RF is a supply chain financing technique designed to maximize working capital by leveraging the buyer's relationship with a third-party funding mechanism. With RF, the buyer establishes an arrangement with a financial intermediary (FI) whereby the buyer's suppliers gain attractive funding based on the buyer's creditworthiness. This paper highlights the issues related to RF and suggests financial statement disclosures, as well as additions to audit programs. The use of RF, a supply chain financing tool, is widely believed to be accelerating rapidly, with current U.S. transactions estimated to be well above $300 billion. Extant accounting guidance for RF has come under intense scrutiny for lack of transparency by investment rating agencies, the Securities and Exchange Commission (SEC), and the Big 4. The specific concern by the SEC and rating agencies is that current RF accounting appears to hide short-term debt in Trades Payables accounts, with a corresponding distortion in the Statement of Cash Flows. Major audit firms are concerned that the lack of U.S. GAAP guidance leads to limited disclosure of RF in practice, elevating litigation risk for auditors if hidden debt leads to the unforeseen collapse of companies with weaker-than-understood cash positions.

BLOOD BANK INVENTORY OPTIMIZATION WITH MACHINE LEARNING TECHNIQUES PROJECT PROPOSAL

Oral

Ms. Tracey Dudding [1], ***Dr. Caleb Bradberry*** [1]

***1.** Radford University*

Machine learning techniques may improve the blood supply chain by reducing blood waste, expenses, and increasing patient health safety. Imagine if a patient were admitted to a hospital, but the required resources were not available to save them. Blood supply chain management tries to avoid such an occurrence by providing enough inventory for uncertain demands. However, inventory surplus may occur with uncertain demands. Specifically, blood component inventory may experience surplus due to differing shelf lives of each component. The objective of the proposed research is to identify if machine learning techniques can better forecast red blood cells, a blood component, than current industry standards, autoregressive integrated moving averages. The blood supply chain will improve by reducing expenses, blood waste, and increasing patient health safety if red blood cells can be better forecasted.

BOND MARKET RESPONSES TO GOVERNMENTAL ECONOMIC DEVELOPMENT INCENTIVES

Oral

Dr. John White [1]

1. *US Coast Guard Academy*

The economic development arm of many states will offer tax incentives in an attempt to entice existing firms to remain in their state and encourage new firms to move to their state. Such tax breaks are rational if the present value of the incremental taxes produced by the incentive exceeds the present value of the cost of the incentive. The problem in such an analysis is that the incremental tax revenues are unknown. This study uses the changes in state bond yields to ascertain whether or not the market perceives the tax incentive is rational.

BRIDGING THE TAX GAP: KEY FACTORS FOR GREATER COMPLIANCE

Oral

Dr. Dustin Grant [1], ***Prof. Greg Kordecki*** [2]

1. *University of West Florida,* ***2.*** *Clayton State University*

The Internal Revenue Service estimates the United States average annual gross tax gap is estimated at $441 billion dollars. Approximately 80%, or $352 billion dollars, is due to underreporting of income. Underreporting of income is not only understating or reporting less revenues or income, but also overstating deductions, tax credits, exemptions, and expenses. Both of those options, and especially a combination of the two, allow for a lower taxable income, leading to underreporting and expanding the tax gap. This paper explores causes of income underreporting. Understanding why taxpayers underreport their income can educate and guide policymakers in reversing the negative effects of our increasing tax gap. The tax gap is a growing epidemic that is plaguing the United States economy, and understanding why income is underreported can lead to better regulations for tax compliance.

Building a Skills-focused Educational Pathway in IT/IS Programs to Skill-based Hiring

Oral

Dr. Michelle Liu [1], ***Dr. Diane Murphy*** [1]

1. *Marymount University*

The COVID-19 Pandemic has impacted the global economy massively, resulting in a magnitude of transitions and transformations in labor markets worldwide. In 2020, more than 140 million people were listed as out of work and another 1.6 billion at risk of income loss (International Labour Organization, 2020). In addition, it was estimated that as many as 25% more workers may need to switch occupations than before the Pandemic (McKinsey Global Institute, 2021). Despite that a great number of the jobs are expected not to return, certain companies and industries are reporting the shortage of individuals with the right skills to be hired. Along with the need for more upskilling and reskilling, skills-based hiring has becomes another accelerating trend during the Pandemic (Ark, 2021; LinkedIn Corporate Communications, 2021; Roslansky, June 08, 2021). Skill-based hiring challenges educators to take an innovative as well as viable approach to prepare our students for this evolving workforce landscape. We propose a skills-focused approach emphasizing more on skills-based competencies rather than solely knowledge-based degree qualifications. This study demonstrates how we reshape our IT undergraduate program with major shifts in thinking about how hiring is done today. We map the undergraduate IT curriculum against the skills identified from current job posting websites, aiming to align the course content to competencies and skills sought after by the employers. In addition to classroom instructions, we also create various innovative channels to expand experiential learning opportunities for skills enhancement. The paper will also discuss our implementation of digital badging system to facilitate our students to document verifiable skills in their digital portfolios.

Characteristics and Leading Indicators of Market Integration for Emerging Economies

Oral

Mr. Shivam Verma [1]

1. *Rutgers University*

The paper identifies a subset of countries with a relatively high likelihood of being emerging market economies close to market integration. The sample is filtered down in two stages to identify which countries have reached market integration and to obtain a timeline of integration for those countries. Once the timeline is obtained, those remaining countries are analyzed over various metrics to identify patterns and potential leading indicators that can signal an incoming market integration.

Cognitive load theory for online business statistics learning and instruction: A structural equation modeling approach

Oral

Dr. Ping Wang [1], *Dr. Susan Palocsay* [1], *Mr. Drew Koch* [1], *Dr. EK Esawi* [1]

1. College of Business, James Madison University

Research by Sweller and his colleagues since 1988 has revealed cognitive limitations of students and indications of what instructors can do to reduce students' cognitive load for improved learning. Statistics has been a notoriously challenging subject for undergraduate business students. This past year, these students also experienced additional difficulties with their learning of statistics in the COVID-19 environment. Poor preparation for college-level mathematics was exacerbated by the challenges of mandated online learning and instruction. The combination raises concerns and has critical theoretical and practical implications for pedagogical improvements in business analytics/statistics courses. However, there is a lack of studies that address these combined issues. This study helps to fill the void by comparing the results of two surveys in the business statistics classes, one held in face-to-face mode before COVID-19, and the other in 100% online mode during COVID-19. Comparisons will be made of the mean differences of the student's perceived difficulty levels of the course content measured by the intrinsic cognitive load, perceived effort of learning the course content measured by the extraneous cognitive load and perceived learning from the course measured by the germane cognitive load. The purpose of the research is to shed light on the importance of instructional design to take into account students' limited cognitive capabilities in business statistics.

College Athletics Student Booster Clubs: Cultivating Future Donors Today

Oral

Dr. Mark Mitchell [1]**, *Dr. John Marcis*** [1]**, *Dr. Melissa Clark*** [1]

1. *Coastal Carolina University*

Student or collegiate chapters of college athletic booster clubs allow athletic departments to engage their current students and cultivate a possible longer-term donor relationship with them. A key motive for students to join a booster club is the ability to ensure access to tickets now and to improve their donor profile in the future. This manuscript examines the benefits offered by student chapters of athletic booster clubs today with the longer-term desire to develop the next generation of donors to support their programs well into the future.

Conjecturing for Automated Discovery of Patterns in Data

Oral

Prof. Paul Brooks [1]***, Prof. David Edwards*** [1]***, Prof. Craig Larson*** [1]***, Dr. Nico Van Cleemput*** [2]

1. *Virginia Commonwealth University,* ***2.*** *Ghent University*

Modern machine learning methods are designed to exploit complex patterns in data regardless of their form, while not necessarily revealing them to the investigator. Here we demonstrate situations where modern machine learning methods are ill-equipped to reveal feature interaction effects and other nonlinear relationships. We propose the use of a conjecturing machine that generates and presents feature relationships in the form of bounds for numerical features and boolean expressions for nominal features. The method generates informative patterns for real-world applications.

COURSE LECTURE VIDEO VIEWS BY UNDERGRADUATE BUSINESS STUDENTS DURING COVID-19: AN EXPLORATORY STUDY

Oral

Dr. Tim DuPont [1]

1. *Newberry College*

This exploratory research paper examines undergraduate business student course lecture video views during COVID-19. A learning management system (LMS), on which the lecture videos were uploaded, recorded the number of views, per student (N=137), per day throughout the spring 2021 semester. This secondary data was analyzed, and descriptive statistics extracted. The purpose of the study is to determine the number of views per student and identify any trends which may present. The findings of this study show the amount of student usage of lecture videos throughout the semester and the average weekly patterns of viewing. Future recommendations for study include an expanded study across disciplines and emphases and a qualitative investigation into the reasons for student views, or lack of views is also suggested.

COVID-19 AND ITS IMPACT ON MULTINATIONAL ENTERPRISES A VALUE AT RISK APPROACH

Oral

***Dr. Kashi Khazeh* [1], Dr. Leonard Arvi [1], Dr. Robert Winder [2]**

***1.** Salisbury University, **2.** Christopher Newport University*

Multinational enterprises (MNEs) have exposure to exchange rate risk. Thus, they utilize variety of tools to mitigate that risk. Since majority of MNEs operate in emerged countries, they will be subject to several types of exposure, but in this study, we focus only on transaction exposure of cash flows in seven distinctive currencies. The "Modified" Value-at-Risk (MVaR) model is employed during eighteen months of data (pre as well as post Covid-19), to estimate maximum one-period loss. The objective is to analyze the extent of the risk. The predicted losses by (MVaR) are then compared with the ex-post results, to advise MNEs in using proper hedging if need be. This study is noteworthy because it will focus in pre/post Covid-19 era.

COVID-19 ON CAMPUS: VACCINE AND MASKING MANDATES AND OPTIONS

Oral

Prof. Claire La Roche [1]

***1.** Longwood University*

At a time when enrollment at many universities was on the decline, the Corona virus pandemic delivered a devastating blow. In an effort to fully reopen, many universities have responded to COVID-19 by mandating that incoming students arrive on campus 'fully vaccinated'. Although several safe and effective vaccines are readily available, none have received more than FDA emergency use authorization – a concept reviewed in this paper. A timely ethical and legal issue with the potential to affect community health is whether a college or university should require Covid-19 vaccinations and whether a university has the right to require incoming students and employees to be vaccinated. The rapid emergence and spread of the highly contagious Delta variant, has made this issue even more relevant. Public health law including vaccine case law and the legality of requiring vaccines is examined. Exceptions to the rule of law and potential legal liability are discussed. The various approaches to vaccines and masking adopted by public and private colleges, as well as advantages and potential perils of these approaches are presented. Suggestions are made to increase safety and at the same time, reduce potential liability and negative consequences.

Covid-19 Statistics: Pandemic Response and Student Success in the University Statistics Classroom

Oral

Dr. Mike Casey [1], *Dr. Joseph Thomas* [1], *Dr. Jeff Hill* [1]

1. *University of Central Arkansas*

Covid-19 Statistics: Pandemic Response and Student Success
in the University Statistics Classroom

The nation's universities have traveled an uncertain path since March of 2020. The Covid-19 pandemic created new challenges across the academic landscape and each institution was required to pivot, and then reinvent the way they educated students. The authors of this paper attempt to create a narrative that follows one such mid-sized southern university as they react to the pandemic in the spring of 2020, and then prepare and attempt to maintain a high level of rigor and engagement in the midst of it. Specifically, this case study tells the story of 600-700 statistics students enrolled each semester in the fall and spring from fall 2019 to spring 2021. The student success data and the policies enacted by the university combine to give insight into what happened, what worked, and what else could be done.

Creating an EXCEL/Analytics "Spine" in the BBA Curriculum

Oral

Dr. Reza Kheirandish [1]

1. *Clayton State University*

The author of this paper is a faculty at a business school in a metropolitan area and he was asked by the dean of the college of business to form a committee to create a set of deliverable tasks/activities within the current business curriculum, where students are exposed to the Excel based exploration, problem solving, and analytics so that by the time they are graduating they are proficient in Excel. The committee proposed that when possible and in all courses that are applicable, throughout the BBA curriculum, we develop Excel based learning, problem solving, data analysis, and data visualization to achieve proficiency in Excel by the time our students graduate. This article reviews those proposed activities suggested for the specific courses within the BBA program.

CUSTOMIZING LEARNING ENVIRONMENTS FOR STUDENTS IN HIGHER EDUCATION: IS IT A BRIDGE TOO FAR?

Oral

Dr. Mohammed Raja [1], ***Dr. Ravi Narayanaswamy*** [2]

1. *York College of Pennsylvania,* ***2.*** *University of South Carolina - Aiken*

The recent Covid-19 pandemic forced most higher learning institutions in the United States to transition from their traditional classroom to online learning format to deliver course content to their students. This enforced adoption has changed the student's and instructor's perspective on education. Moreover, some institutions plan to utilize online learning and a hybrid-flexible learning format even after the pandemic [2]. This study draws on the tenets of the Person-Environment fit theory to determine practices for improving student learning satisfaction in online courses. In particular, the focus is to understand how the fit between student needs measured in terms of emotional intelligence and technology readiness and the instructional environment measured in terms of instructor support and instructor performance affect students' learning satisfaction in an online course. The data for this study will be collected from undergraduate students enrolled in at least one three-credit online course during the academic period, 2020-21. The focus of data analysis will be on testing the level of fit.

Keywords: Instructor support, technology readiness, learning environment, emotional intelligence, student performance, learning satisfaction

Data Analysis Begins with Data

DASI Session

Prof. Paul Brooks [1], **Dr. Bharat Kolluri** [2], **Dr. John N. Dyer** [3], **Dr. Ning Jia** [2], **Dr. Ping Wang** [4]

1. Virginia Commonwealth University, 2. University of Hartford, 3. Georgia Southern University, 4. College of Business, James Madison University

This will be an interactive session with attendees and a panel of individuals who have a variety of experiences instructing classes with a focus on the use of data. In an analytics focused environment, data are the source of facts and insights used by decision makers for managing the processes they oversee. The tendency for a data analysis class can easily have an almost exclusive focus on the analysis procedures used to extract the facts and insights for decision making with little to no focus on the data. A college friend often said, you can't make chicken salad out of chicken manure. Good facts and insights are not extracted from crappy data.

When one cooks or builds something we know that the quality of the finished product will depend on the quality of the materials used. Before cooking a dish with vegetables, one spends time selecting the proper vegetables and then cleaning them and removing any bad spots. All of this corresponds to selecting, cleaning and preparing data to be analyzed to obtain facts and insights for a task at hand.

In an analytics setting, there are decisions that must be made. To make the best decisions one needs to understand the analytics process and obtain data that are the most relevant for the decision-making situation. An overview of the analytics workflow will be presented and push vs. pull analytics will be discussed. One might think that ideally one would collect a set of data perfectly suited for the decision-making situation, but in most cases, there is a cost or time constraint that restricts the data choice to existing data that may exist in large data sets, database systems, data warehouses, data catalogs, etc. No matter the source, data are frequently plagued with "dirty data." Dirty data can be defined simply as "data not readily suited to the task at hand." The task at hand for analytics is calculating facts or discovering insights for decision making. The session will include a discussion of the dirty data problem that covers the various data structures, content types that require cleaning, and present a set of common and easily applied data cleaning tools along with examples of "dirty" data.

A current discussion of data needs to address "big data" in some way. "Big data" was originally associated with three key concepts beginning with the letter V: Volume (size), Variety (different types), and Velocity (arrival speed). Then others suggested additional V words that included Veracity (quality) and Value (relevance to the task at hand) along with numerous others such as vagueness, validity, variability, venue, verbosity, versatility, virality, viscosity, visualization, vocabulary, volatility, and voluntariness. Students should know that big data generally refer to data that are so large and/or complex that traditional analysis methods are not adequate to analyze them. For analytics, the Vs of Veracity (quality) and Value (relevance to task at hand) are characteristics of ultimate importance for all sizes of data sets and should be emphasized in an introductory data analysis class.

The V of Variety (different types) should also be of importance to instruction in an introductory data analysis class. Students should be exposed to the different types of data that they may encounter. Analysis procedures in the introductory class typically categorize data into either quantitative data or qualitative data with a major focus on the analysis of quantitative data. Facebook, Google, Apple, Amazon, Walmart, etc. produce and store huge amounts of data. Variables in the data can be categorized as quantitative, qualitative or unstructured data. The shift in the quantities of the data types is away from quantitative data but there is no clear indication that there is a corresponding shift toward more emphasis on qualitative data.

This session will hopefully present some ideas/areas of importance for those attending to consider implementing in their data analysis course.

DAY OF THE WEEK EFFECT IN US EQUITY MARKET: 2001-2020

Oral

Prof. Fatollah Salimian [1], ***Dr. Robert Winder*** [2], ***Dr. Herman Manakyan*** [1]

1. *Salisbury University,* ***2.*** *Christopher Newport University*

Numerous studies have been performed to investigate day of the week anomalies in the equity markets all around the world. Many of these studies have utilized arithmetic means to compute average daily returns. Additionally, they don't reflect the contemporary patterns that exist in modern equity markets structure. This study aims to portray differences in US equity market daily returns during 2001-2020, based on both arithmetic and geometric means. The study further computes seasonal indexes for the days of the week when trading takes place. The results of this research mainly reveal that Mondays are least pleasing to the general equity investors, as the average daily return on stocks as represented by S&P 500 was actually negative. Additionally, the standard deviation of daily returns was the highest on Mondays. Tuesdays, on the other hands, were the most favorable day of the week on the grounds of the highest daily return.

Differences in Online Students Compared to In-Person Students in Accounting Classes

Oral

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This study presents findings on the differences between students who elect to take a course online as compared to students who choose to take the same course in person. We find that the constructs Lazy User, Frustration, Self-Efficacy, Locus of Control and Technical-Efficacy explain and predict student performance of online students better than they explain the performance of in-person students. In fact, we found that this model explains an online student's performance better than using GPA alone but does not do a good job of predicting an in-person student's grade. Given that information technology is an integral part of our environment – that every student has a cell phone and knows how to operate a computer – we attempt to focus on characteristics that might be differential in an online learning environment.

DISRUPTORS AT THE TRACK: ISSUES WITH THE NASCAR CUP SERIES PLAYOFFS POINTS DISTRIBUTION

Oral

Dr. Clay Harshaw [1]

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From the beginning of the modern era of the NASCAR Cup Series (Cup) in 1971 until 2003, the Cup champion was determined by the accumulated points a driver earned during the season. This points scenario occasionally produced champions before the final races in the season which led to lower fan interest in those events and lower television ratings. To make the final races more interesting to fans and to improve television ratings, NASCAR developed the "Chase for the Championship" (Chase) in 2004 [2].

The Chase was conducted over the final ten races of the season with the top ten drivers in points from the regular season. The championship contenders had their points adjusted based on their regular season rankings. The champion was determined by the total accumulated points at the end of the Chase. NASCAR revised the format to place more emphasis on winning races by adding two "wild card" positions for the two drivers with the most wins in the regular season but not in the top ten in points [2].

In 2014, NASCAR announced a number of competition changes and its points structure. To make the early and middle parts of the races more interesting to fans and more consequential to the championship points, the races were divided into "stages" with the top ten drivers of the first two stages receiving bonus points. The stage winners earned "playoff points" which were added to the accumulated points for the race [1]. Sixteen playoff contenders are determined in two ways: Winning a regular season points race or finishing within the top sixteen drivers of points.

To determine the season champion in the NASCAR Cup Series, eligible drivers compete in a 10-race playoff styled "tournament." The structure of the NASCAR play-offs is similar to that of other sports playoffs with single-elimination ladder tournaments. However, rather than head-to-head competition with championship contenders, the drivers continue to race in mass start events against the contenders and non-contenders. Eligible drivers advance in the playoffs either by winning an event in the elimination rounds or by accumulating greater amounts of event points earned in those rounds than their competitors [1][2]. In the current structure of the playoffs, all drivers are awarded event points based on their finishing positions. Therefore, the non-contenders pose a potential disruption to the outcome of the championship playoffs.

Data from the 2019 NASCAR Cup Series Playoffs was utilized in this study to provide an alternative points structure for determining the Cup champion. The alternative points structure would generate a more fair distribution for playoff contenders as measured by the Gini coefficient, a concentration measurement [3]. Potential impacts of the alternative to the championship outcome will be discussed in the presentation.

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EMERGENCY MANAGEMENT AGENTS ASSESSMENT OF THE VALUE OF PUBLIC-PRIVATE RELATIONSHIPS

Oral

Dr. Douglas McWilliams [1], *Ms. MaQueba L. Massey* [2], *Dr. Phylicia Taylor* [3]

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Disasters wreak havoc on state, local, and international communities year after year, with increasing devastation, loss of life, and economic impact. Weather disasters can have lasting implications for supply chains for all industries, including food, healthcare, manufacturing, and technology. As the COVID-19 global pandemic continues to ravage countries worldwide, research supports that a man-made disaster, like COVID-19, can be just as devasting as a natural disaster. Emergency management agencies must focus on investing in strategic partnerships and the role of complementary and idiosyncratic resources to respond to these disasters. The research contributes empirical evidence collected from emergency management agencies that provide insight into the perception of the value of partnerships. The study evidence suggests partnerships impact the relationship between emergency agencies and complementary and idiosyncratic resources.

ESTIMATED IMPACT OF COVID-19 ON EXCHANGE RATE RISK OF MULTINATIONAL ENTERPRISES OPERATING IN EMERGING MARKETS

Oral

Dr. Leonard Arvi [1]***, Dr. Kashi Khazeh*** [1]***, Dr. Herman Manakyan*** [1]

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Multinational enterprises (MNE) operating in emerging countries are exposed to various types of risk. Exchange rate risk is an important and anticipated part of MNE's total risk exposure, with a variety of tools available to mitigate that risk. In this study, we focus on transaction exposure of cash flows in eight distinctive emerging market currencies and employ the Modified Value-at-Risk (MVaR) model to estimate the maximum one-period loss during an eighteen-month period spanning pre- and post-Covid-19 periods. The predicted losses by MVaR are then compared to the ex-post results, to identify any differences in the pre- and post-Covid-19 periods and to determine the need for adjustments in hedging strategies by MNEs during similar global crises. The motive of this research is to understand the limitations of hedging and what can MNEs do to mitigate transaction exposure risk. The results provide insights on whether MNEs should hedge their currency risk or not. The COVID-19 pandemic did impact all firms globally so this study is relevant and pertinent as firms plan their post-pandemic growth.

Estimating the Length of the Optimal TSP Tour for Fewer Nodes

Oral

Dr. Emre Kirac [1]

1. *Christopher Newport University*

Estimating the length of the optimal tour is useful where we do not need to know the exact tour, but the length. Examples of such cases include public transportation systems, traveling repairperson systems, home health care routing systems, Amazon Flex delivery systems, and courier service systems. This approximation comes especially in handy when a quick decision needs to make by a decision-maker regarding the cost or length of the optimal tour. Consider, for example, a disaster relief routing where a manager needs to decide whether a single-vehicle tour would be enough to serve all locations. In most of the realistic problems, the number of stops (locations) in the tour is fewer. It is typical for a tour to make less than 100 stops. For many of these applications, the city areas covered tend to be of irregular geometric shapes. Therefore, it is critical to deriving an approximation to estimate the optimal tour length when fewer than 1000 nodes are geographically non-random located in an irregular shape area. In this study, we develop a regression-based model to predict the length of the optimal TSP tour for fewer nodes.

Ethical Decision Making and Perception of Business

Oral

Mr. Franklin Tillman [1]

1. *University of Mississippi*

Emotions significantly influence how people conduct themselves in their daily lives and interactions with others, especially in ethical decision judgements across a variety of situations (Connelly et al 2004; Steenhaut and Van Kenhove 2006; Cohen et al 2013). Several scholars have called for the inclusion and examination of the emotional component in marketing ethics research (Lurie 2004; Connelly et al. 2004; Tenbrunsel and Smith-Crowe 2008; Kim et al. 2009; Vitell et al. 2013). Tenbrunsel and Smith-Crowe (2008) even begin to question the belief that ethical decision making in ethical situations is based in reason. Other research has also stated that decision making can be influenced by an individual's emotional state and that emotions may impact intentions, resulting in behavioral intentions to differ from individual ethical judgements (Gaudine and Thorne, 2001). Kligyte (2008) stated that if an individual is in a state of unregulated anger, this can directly and negatively impact intentions and resulting behavior, therefore causing a person to act in a manner that is different from true ethical beliefs. Consumer behavior literature has focused on emotions as a key element in the decision-making process, with various studies focusing on consumer decision making regarding consumer ethics (Vitell et al., 2013). Ethical decision making by consumers is an essential component of consumer behavior, and can be impacted by emotions, therefore the study of exactly how emotions can influence consumer behavior is worthy of further examination.

Despite the attention that has been given to understanding ethical decision making, there are other influencing factors that have received much less attention. Emotions and emotion-related factors, such as emotional commitment are a couple of the factors that require further examination. Hardy (2006) stated that emotions may be the main motivating factor that leads to a moral action. In accordance with the cognitive theory of emotion, individual's decision-making and subsequent actions are determined by interaction with the environment. This interaction is vital to understanding how emotions originate as a result of experiences in various situations and how these emotions influence decision making (Vitell et al., 2013). In everyday life individuals encounter a multitude of situations that are capable of inducing stress and eliciting an emotional response.

The affective state of emotion is described as either positive or negative affect (Fillenbaum and Rapoport, 1970). Negative affect encompasses emotions such as anger and fear, while positive affect includes emotions such as happiness and joy. Gaudine and Thorne (2001) suggest that positive emotions will increase the likelihood that individuals will recognize ethical dilemmas, possess ethical intentions congruent with moral development, and act consistent with intentions if emotional arousal is present. Previous research suggests that positive affect also increases access to congruent memories, Bower (1981) observed that positive emotions allow access to a greater amount of information with positive emotional associations. Thus positive affect provides the ability to more correctly identify ethical dilemmas due to the increased amount of information available for retrieval. The Gaudine and Thorne model also acknowledges the impact of negative emotions in that negative emotions are likely to have different effects in an ethical decision-making process (Connelly et al, 2004). Different negative emotions can focus an individual's attention outward when in an angered state, where as depression can focus attention inward.

Two sources of emotions have been identified and studied in consumer behavior literature: task-related and incidental (Vitell et al., 2013). Task-related emotions are inherently associated with the situation currently being faced or performed. Incidental emotions are unrelated to the current situation and originate from incidents or cognitions that are irrelevant to the current task. Incidental emotions tend to remain and influence the way in which individuals deal with subsequent stressful situations and decision making (Vitell et al., 2013). The influence of incidental emotions and task-related emotions has been deeply studied in consumer behavior literature (Garg et al., 2005), the influence of incidental and task-related emotions in ethical decision making has been limited thus far (Vitell et al., 2013).

A primary concern of the research is the effective manipulation of emotions and the measures of emotions. The type of manipulations employed is consistent with those utilized in previous emotion research (Garg et al 2007; Singh et al. 2016). The emotions of angry, mad, furious, irritated, and enraged are utilized to induce the negative emotion score of anger. To induce the positive emotion of happiness, the emotions of joy, delight, pleasure, and happy are utilized. To induce the desired emotional condition, participants will be asked to recall several life events during which they experienced a great deal of happiness or anger, with the control group describing a typical daily routine. After recalling these events participants in an emotional manipulation state will then be asked to describe the details of feelings or emotions [positive or negative) felt during the most intensely recalled situation. Following this emotional recall, the participants in the positive emotion group will read a scenario which will describe the details of an encounter with an individual followed by a corresponding dining experience. At the conclusion of the dining experience the participant will be presented with the ethical dilemma of receiving too much change when paying the bill. The scenario of receiving too much change when paying the bill is contained in the Consumer Ethics Scale of Muncy and Vitell (1992), and is adopted from this previous research. This situation is utilized because the unethical reaction of not correcting the mistake and keeping the excess change is found to be relatable, common, and widespread among consumers as a whole. The scenarios presented to the participants provide an acceptable and familiar means of conducting consumer ethics research when the observation of real-life behaviors is impractical.

Ethical Intention: The Effects of Anonymity

Oral

Dr. Jacob Voegel [1]

1. Coastal Carolina University

Ethics is a very complex subject and a part of philosophy that deals with what is morally right and wrong (Woermann and Cilliers, 2012), and has been defined as "…inquiry into the nature and grounds of morality where the term morality is taken to mean judgments, standards, and rules of conducts" (Akaah and Lund, 1994). The history of ethics dates back as far as mankind, yet, ethics and ethical behavior are topics that will forever warrant further investigation. Specifically, this study investigates the effect of anonymity on an individual's ethical behavior. This study does not necessarily care about an individual's ethical barometer, or how ethical an individual believes any given act be. Rather, this study focuses on how important anonymity is on an individual's willingness to pursue what they believe is unethical.

To better understand the relationship of anonymity and ethical intention, this study utilizes the theory of planned behavior (TPB) and deindividuation theory. The TPB addresses an individual's attitude toward an action, the subjective norms associated with the action, and the perceived behavioral control as the precursors of behavioral intention, and posits behavioral intention as the predecessor of actual behavior (Ajzen, 1991). This study builds on the TPB by introducing anonymity as both a predictor of ethical behavior and as a moderator on both the attitude-intention relationship as well as the subjective norms-intention relationship. Deindividuation theory is utilized to account for the effects of anonymity on ethical behavior. Deindividuation theory proposes a subjective deindividuated state that accounts for anonymity and causes transgression of general social norms (Postmes and Spears 1998).

Voluntary responses to a survey including a series of scenarios is used for data collection. A method called policy capturing assisted by regressions and Tukey's HSD is utilized for data analysis. This method allows each of the independent variables (attitudes, subjective norms, perceived behavioral control, and anonymity) to be manipulated in order to determine their level of importance in regards to an individual's ethical intention. The most interesting findings are found when anonymity runs counter to attitude and/or subjective norms.

Examining Development of Automotive Inventory Dynamics

Oral

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This study applies a regression method to examine inventory dynamics on durable finished goods in automotive supply chain. We test both demand-oriented and supply chain-associated influences on the development of inventory dynamics. Our findings will provide managerial implications regarding how to better manage inventory dynamics.

EXCEL BASED SCREENCASTING: THE ON-DEMAND TUTOR FOR ENHANCED LEARNING OUTCOMES IN THE ERA OF COVID-19

Oral

Dr. John Downs [1]

1. *Lander University*

Screencasting has changed the way students at universities are being taught online courses in their curriculums. Finance and Accounting professors are now increasing the effectiveness of student learning outcomes by recording Excel based technical content in the form of screencasts and making them available as needed. Their use amplifies the ability of the instructor to supplement traditional lecture with interactive learning materials that change the role of the student from a passive learner to an active participant in the learning process. As a result, students are now able to control self-identified points interest to adjust the flow of information from the instructor to a speed that is conducive to their student preferred learning styles. This phenomenon has had tremendous benefits for instructor efficiency and student learning outcomes that will continue shape online education into the future.

Expert Systems with Applications

Oral

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Expert Systems with Applications is a refereed international journal whose focus is on exchanging information relating to expert and intelligent systems applied in industry, government, and universities worldwide. The thrust of the journal is to publish papers dealing with the design, development, testing, implementation, and/or management of expert and intelligent systems, and also to provide practical guidelines in the development and management of these systems. The journal will publish papers in expert and intelligent systems technology and application in the areas of, but not limited to: finance, accounting, engineering, marketing, auditing, law, procurement and contracting, project management, risk assessment, information management, information retrieval, crisis management, stock trading, strategic management, network management, telecommunications, space education, intelligent front ends, intelligent database management systems, medicine, chemistry, human resources management, human capital, business, production management, archaeology, economics, energy, and defense. Papers in multi-agent systems, knowledge management, neural networks, knowledge discovery, data and text mining, multimedia mining, and genetic algorithms will also be published in the journal.

Faculty Self-Efficacy and the Pandemic: Lessons Learned for Course Development

Oral

Dr. Kelli Horne [1]

1. *Lander University*

The spread of the coronavirus (Covid-19), brought about many changes to many robust university networking systems that allow students from numerous geographical areas to engage in close proximity of one another. The change in dynamic resulting in a period of expansive growth in online learning in the U.S. higher education, had a direct impact on the self-efficacy of instructors. Teaching self-efficacy is important because it is the basis for a professor's propensity to work through challenges brought about in the teaching environment, for example, transitioning to online teaching. According to Horvitz et al. (2014) future research is necessary to understand the way institutions train and support professors to teach online, focusing attention on building self-efficacy and applying this knowledge to current practices. The research questions to be answered are (1) **What affect did the COVID-19 pandemic have on faculty self-efficacy? And (2) RQ2: Is there a positive correlation between faculty self-efficacy and [graduate] course quality?** Data are gathered via a survey instrument of specific questions that will provide statistical information to prove or disprove each hypothesis. The results of this research will provide new knowledge of course design quality and its effect on faculty self-efficacy. This new knowledge can be applied to the development of online MBA course design in the post-pandemic period to ensure that MBA courses programs offer leadership effectiveness competences for students and increased self-efficacy for faculty.

Feasibility of Multi-Sensory Environments of Virtual Reality for Non-Profit Organizations Helping People with Disabilities

Oral

Dr. James Lawler [1]

1. *Pace University*

Community engagement courses benefit non-profit organizations on diversity projects.
The authors of the paper evaluate feasibility findings from multi-sensory projects of virtual reality for people with disabilities at a local non-profit organization. The paper can be beneficial in contributing guidance to non-profit organizations helping people with disabilities on projects of technology involving community engagement students.

GREENESS' RELATIONSHIP TO FINANCIAL SUCCESS

Oral

Dr. Jasna Marker [1], ***Dr. Craig Marker*** [1]

1. *Mercer University*

Corporate sustainability efforts have been gaining attention both from consumers and businesses. For businesses, several potential benefits are resulting include social, economic, and environmental benefits. While many studies have indicated various benefits, there is a considerable level of ambiguity in affirming that greener processes result in higher profits. This study examined whether green initiatives lead to greater profit or change in profits using longitudinal data. The study utilized the Newsweek “Greenscores” to measure greenness. Profits were obtained for Fortune 500 publicly traded companies for the years 2011 through 2019. Level of greenness and change in greenness were used as the independent variables of the analysis. The study utilized cross-lagged regression to determine whether the previous Greenscore affects later company profits or whether the change in greenscore affected profits. Cross-lagged regression allows for different time lags. Thus, the study was able to examine whether greenness (or change in greenness) affects profitability one, two, or three years later. The cross-lagged regression did not find the absolute amount of greenness that affected the profit at 1, 2, or 3 years later. A Latent Change Score Model showed that change in greenness predicted profit at 1, 2, and 3 year time lags. The change in greenness seems to be more important to profits than the absolute level. With this data, companies investing more in green initiatives saw an increase in profits in the next fiscal year. That is, companies that changed more in their greenness had significantly greater profits a year and two years later. This research provides a first step for analyzing the relationship between corporate environmental consciousness and profitability.

How a Small Family Business Entered a New Market in Compliance with Federal Governmnet Policy

Oral

Dr. Michael Latta [1]

1. Coastal Carolina University

This case is at the intersection of small business Marketing Strategy, Business Ethics, and Compliance with Federal Policy. It covers a small family business founded in 1984, Mid-Atlantic Drainage, which grew into a leading manufacturer and distributor of drainage products in South Carolina. Company vision meant a move to expand from South Carolina into North Carolina. The goal was to participate in the business of Federal Highway (FHWA) expansion and repair. To make that move, the North Carolina Department of Transportation followed Federal Rules that required Mid-Atlantic-Drainage to have all employees attend an ethics training program. This case is designed to show how having employees trained in small business ethics can be a valuable tool for new market entry.

How Different are Student Learning Styles in the Decision Sciences?

Oral

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1. *North Carolina A & T State University,* ***2.*** *North Carolina A&T State University*

Our work augments a growing base of literature focused on the use of student learning style data to promote greater student success in collegiate coursework. We specifically, characterize student learning style data in business courses rooted in the decision sciences. Business schools have increased the development and emphasis on courses oriented in the decision sciences in response to industry needs for a data competent workforce. We use the Felder-Silverman Inventory of Learning Styles (ILS) to capture the learning preferences of undergraduate students taking courses in the decision sciences at a minority-serving, regional university in the southeastern United States. There were a total of 431 usable student responses over 10 semesters included in this study. Students were enrolled in both face-to-face and online course delivery formats. Descriptive statistics reveal that most students fall into the active, sensing, visual, and sequential learning style permutation. This is useful information for educators to know upfront to configure the right pedagogical mix of learning activities to promote student success.

How to Effectively Manage Remote Employees

Oral

Dr. Nancy Niles [1]

1. Rollins College

Remote work or telecommuting has become increasingly popular as a result of the Covid-19 pandemic. Although remote work has its benefits, it is important to manage these employees to ensure their productivity and commitment to the organization. It is a change in structure – less structure which can be a difficult transition for employees. As a result of this change in how employees work, many managers are not prepared to manage remote employees. According to a 2018 global study of 2,000 employees, two thirds of remote employees were not engaged and one third never received any face-to-face interactions with their teams. Forty percent of employees indicated improving communication would build better relationships with the organization. Other worker complaints included feeling isolated from the rest of the organization, inconsistent and timely communication, feeling unappreciated when they performed well, being micromanaged and lack of understanding of the culture of the organization (Schwabel, 2018). Based on survey research, six strategies were developed to resolve these employee management issues. The paper includes a discussion of these strategies and their integration into the four management principles of planning, organizing, leading and controlling (Watson, 2017). Although this paper focuses on the health care industry, these strategies can be applied to many industries.

Implementing a Student-Managed Cryptoasset Fund in Finance Curriculum

Oral

Dr. Timothy Carpenter [1]

1. *Roanoke College*

In 2004, Roanoke College began offering a Student-Managed Fund course, wherein students were able to manage a portfolio of equity and fixed income using real money. This was a somewhat new concept at the time and has since become standard practice for finance programs, either through courses or clubs. In February 2019, we supplemented our activities in this course with the addition of real cryptoassets for the students to manage. It is certainly one of the first, and to the author's knowledge may be the only, real money cryptoasset fund managed by students. This paper discusses the implementation of this fund as well as its pedagogical advantages.

Importance of Mental Health Policies in the Workplace for U.S. Adults

Undergraduate Student Poster

Ms. Haley Rabon [1], *Dr. TaQuesa McLeod* [1]

1. Lander University

Background: Mental health is an important aspect of health care. When we care for someone holistically, mental health is included in that care, therefore, it should be a priority. Measuring mental health illnesses can help better understand their impacts (physical, social, financial, etc.). It can also help raise awareness, reduce stigma, and advocate for better health care.

Statistics:

1. Depression is one of the most common mental illnesses, affecting 6.7% of the population which is more than 16 million American adults each year (NAMH, n.d.).
2. One in every five U.S. adults experiences mental illness each year (CDC, 2021).
3. More than 50% of U.S. adults will be diagnosed with a mental illness or disorder at some point in their lifetime (CDC, 2021).
4. In 2018, there were 4.9 million visits to emergency departments with mental disorders, behavioral, and neurodevelopmental as the primary diagnosis (CDC, 2021).

Lifestyle Impacts: Mental illnesses do not necessarily have one singular cause, it can be triggered by various Social Determinants of Health (SDoH) to include biological, economic, and social factors. The Healthy People 2030 objectives seek to reduce the burden of depression among adults in the United States.

Mental illnesses such as depression are associated with higher rates of disability and unemployment. If not treated adequately, depression can also lead to increased costs for payers, employers, and patients. Early detection, intervention, and appropriate treatment can promote remission, prevent relapse, and reduce the emotional and financial burden of depression.

According to the CDC, depression interferes with a person's ability to complete physical job tasks about 20% of the time and reduces cognitive performance about 35% of the time (CDC, 2019).

Management Action: Develop a policy that requires employers to implement workplace mental health policies aligned with national public health initiatives. Policies will provide employees with enhanced support services such as counseling and treatment plans. According to the Bureau of Labor Statistics, 10 paid vacation days per year is the national average for employees. Increasing the number of days to 14 allows employees 2 weeks per year.

The workplace is a key intervention setting where both mental and physical health can be improved and promoted among the working adult population (WHO, 2014). Unemployment and poor-quality employment are very strong risk factors for mental health disorders. Job security and a sense of control at work help promote good mental health. Therefore, employers have a significant role in reducing or exacerbating mental health disorders among the working adult population (WHO, 2014).

Conclusion: Poor mental health and work stressors can negatively affect employee job performance, productivity, engagement, and other work-related functioning (CDC, 2019). Employers have a significant role in reducing or exacerbating mental disorders among working-age populations. Implementing a workplace mental health program will benefit employee health, increases productivity and sales, and contribute to the community's overall well-being.

Improving Experiential Learning to Bridge the STEM Workforce Gap

Oral

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1. *Radford University,* ***2.*** *Coronet Technology Enterprises (dba CivilianCyber)*

Colleges and universities provide valuable knowledge to students enrolled in accredited undergraduate cybersecurity degree programs. However, surveys of employers routinely indicate students from traditional programs are not workforce ready upon graduation due to two factors: lack of critical thinking/soft skills [1] and the inability to apply theoretical or abstract knowledge [2] learned in the classroom.

Student internships designed to close the gap must improve both quality and quantity. To develop workforce ready cybersecurity professionals, higher education must partner with employers to provide applied, hands-on, structured learning experiences and support small businesses. This paper discusses research projects conducted by an interdisciplinary team representing public, private, and educational sectors to: (1) increase and improve student experiential learning opportunities, (2) improve the overall workforce pipeline for high-demand STEM careers, and (3) increase employer awareness and engagement in experiential learning initiatives and resources. The paper reports initial results and recommends next steps.

IMPROVING ONLINE VIDEO LECTURES: REVISITING MAYER'S COGNITIVE LOAD THEORY

Oral

Dr. William Crandall [1], ***Dr. SiAhn Mehng*** [1]

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This paper focuses on the development of effective online video lectures (OVLs) using the principles of cognitive load theory. We begin with a definition of an OVL and its benefits. We then examine the principles of cognitive load theory and how they relate to the construction of an OVL. Next, we look at the dual channel framework that accompanies cognitive load theory. We conclude with practical applications that faculty members can incorporate in the development of their OVLs.

INFORMS Journal on Computing

Oral

Prof. Paul Brooks [1]

1. *Virginia Commonwealth University*

The theory and practice of computing and operations research are necessarily intertwined. The *INFORMS Journal on Computing* publishes high quality papers that expand the envelope of operations research and computing. We seek original research papers on relevant theories, methods, experiments, systems, and applications. We also welcome novel survey and tutorial papers, and papers describing new and useful software tools. We expect contributions that can be built upon by subsequent researchers or used by practitioners.

Integration of Business Sustainability, Corporate Governance and Organization Ethics into the Business Curriculum

Oral

Prof. Zabihollah Rezaee [1]

1. The University of Memphis

Three issues of “Business Sustainability”, “Corporate Governance”, and “Organizational Ethics” (BSCGOE) are taking centre-stage in the global competitive environment. Our educational responsibility is to train the most competent and ethical future business leaders and accountants with cutting-edge, life-long learning, and relevant education including BSCGOE topics. Businesses worldwide have adopted the concept of profit-with-purpose to create long-term shared value for their stakeholders from shareholders to customers, employees, suppliers, society, and the environment. Business sustainability with the primary focus on achieving financial economic sustainability performance (ESP) and generating non-financial environmental, ethical, social, and governance (EESG) sustainability performance has advanced in the past decade from branding and greenwashing to a strategic imperative with its integration into corporate culture, business models, corporate governance, supply chain, and managerial decisions. In recent years, investors have demanded, regulators have required, and companies have disclosed long-term financial ESP information as well as non-financial EESG sustainability information. Global public companies today face the challenges of adapting proper sustainability strategies and practices to effectively respond to social, ethical, environmental, and governance issues while creating sustainable financial performance and value for their shareholders. Business colleges and accounting schools respond to the emerging initiatives in BSCGOE by integrating these important educational topics into their curricula. The justifications and rational for offering BSCGOE education are:

1. The accreditation standards now require “Business Sustainability, Corporate Governance, and Organizational Ethics” education for business colleges and accounting schools starting January 2019.
2. Your college can be among the first groups of colleges that proactively implement educational accreditation Standards and show commitment to life-learning business education in training, the most competent and ethical future business leaders.
3. Business sustainability is now being integrated into corporate culture and strategic decisions because sustainability performance information is demanded by investors and required by global regulators, more than 45,000 business organizations are now disclosing sustainability information worldwide.
4. Sustainability is also integrated into all disciplines in business colleges from management, accounting, supply chain, marketing, economics, finance, and BIT and more than 450 business programs offer a stand-alone business sustainability course.
5. Business sustainability, corporate governance, and professional ethics are taking centre stage in the global business environment.
6. Corporate governance has been the main theme of the 21st century and business sustainability is transforming from branding and greenwashing to a business strategic imperative.
7. Organizational ethics has been promoted in improving and promoting corporate culture of integrity, competency, and accountability and preventing future financial scandals and crises.
8. Teaching materials and textbooks including the book entitled “Business Sustainability, Corporate Governance, and Organization Ethics” (e.g., Rezaee and Fogarty, 2019), are now available in providing BSCGOE

education.

9. These books present a comprehensive framework of the theory, practice, and research of BSCGOE, which are regarded by many as a cornerstone of business education and vigorously promoted by accreditation organizations worldwide.
10. BSCGOE education can be offered at both the undergraduate and graduate levels, as it is designed to develop an awareness and understanding of the main themes, perspectives, frameworks, and issues pertaining to BSCGOE.
11. Alternatively, different modules of BSCGOE education can be infused into a variety of undergraduate and/or graduate accounting and business courses.
12. This panel session is intended to provide a comprehensive discussion and suggested materials for those business colleges and accounting schools that are currently offering or planning to offer BSCGOE education, as well as for professionals who need an up-to-date understanding of emerging areas in business.

Is the Increase in Financial Literacy Education Having an Impact?

Oral

Dr. Michael Smith [1], ***Dr. Michelle Hagadorn*** [1]

1. *Roanoke College*

In recent years, there has been a dedicated and concerted effort by educators to improve financial literacy, both at the high school level, and in higher education. Unfortunately, several studies have suggested that these increased efforts may not be creating a lasting practical impact with American consumers. In this article, we analyze consumer data to determine American consumers' spending habits from 2005 – 2019 in an attempt to determine if increased financial literacy education efforts are correlated with decreased spending (a very basic habit for the financially literate). The results suggest that irresponsible spending (spending more than one's income) has actually increased for consumers under the age of 25, but has improved for those aged 25 to 34. Given that current efforts to improve financial literacy appear to be lacking for the nation's younger consumers, we propose additional educational initiatives that take place both in and out of the classroom.

Job Satisfaction, Motivation, and Productivity in Telework

Undergraduate Student Poster

Ms. Emily Curfman [1]***, Dr. Johanna Sweet*** [1]

1. *Roanoke College*

With the recent pandemic of COVID-19, many individuals have been forced to telework. This change has created stressors for employees and companies need to find ways to improve job satisfaction so that productivity does not decrease. This literature review will identify the positive and negative aspects associated with teleworking. Additionally, this literature review will identify techniques to maintain or increase job satisfaction for employees during this difficult time. This literature review is important because job satisfaction directly correlates to productivity. If employers implement these job satisfaction techniques, they should experience an increase in overall productivity.
Keywords: job satisfaction, telework, telework management, productivity, COVID-19

Machine Learning with Applications

Oral

Dr. Binshan Lin [1]

1. *Louisiana State University Shreveport*

Machine Learning with Applications (MLWA) is a peer reviewed, open access journal focused on research related to machine learning. The journal encompasses all aspects of research and development in ML, including but not limited to data mining, computer vision, natural language processing, intelligent systems, neural networks, AI-based software engineering, bioinformatics and their applications in the areas of engineering, medicine, biology, education, business and social sciences. It covers a broad spectrum of applications in the community, from industry, government, and academia.

The journal publishes research results in addition to new approaches to ML, with a focus on value and effectiveness. Application papers should demonstrate how ML can be used to solve important practical problems. Research methodology papers should demonstrate an improvement to the way in which existing ML research is conducted.

MAINTAINING ACADEMIC INTEGRITY IN ONLINE TESTING: A METHOD TO ENSURE STUDENTS AREN'T CHEATING?

Oral

Dr. Amit Shah [1], ***Dr. Michael Monahan*** [1]

1. *Frostburg State University*

Ethical behavior is often expected and assumed when students take exams. In a face-to-face class the instructor can observe firsthand that no notes, cell phones or other devices are being used. However, in an online class, students are often on the honor system to take the exam without help. Yet the instructor can believe students have cheated but cannot be sure. With the help of Respondus Lockdown Brower faculty can be certain unethical behavior is not occurring.

The authors compiled data from the prior three years by examining test scores without the browser and then compared the data from one year with the browser. The results are telling. While we want to trust our students, the temptation and ability to cheat is far too easy. By removing the ability to cheat students can get a much clearer picture of what they learned. The purpose of this paper is to present our findings, explain the advantages of the lockdown browser and provide faculty and students alike with the ability to maintain academic integrity.

Marketing Strategies and the Impact on Firm Performance in Response to Covid

Oral

Mr. Franklin Tillman [1]

1. *University of Mississippi*

MARKETING STRATEGIES AND THE IMPACT ON PERFORMANCE IN RESPONSE TO COVID

Cause-Related marketing campaigns are complex promotional tools that present organizations with numerous strategies for implementation. Cause-related marketing (CRM) has labeled as profit motivated giving due to the linkages created between company sales and charitable donations (Varadarajan and Menon, 1988). As corporate responsibility continues to increase in importance, so has corporate social activity, and executives are far more proactive in regards to the tactics utilized in giving funds that are congruent with the firm's corporate social responsibility strategy. Unlike corporate donations, where contribution is based on altruistic motivations of management and shareholders, corporations launch strategic initiatives that considers the gifts and practices as investments and calculates returns for the firm (Orlitzky et al, 2003). A central question to consider is how does campaign duration ultimately influence firm performance? These strategies can be designed to increase short term sales, build goodwill, improve firm reputation, or develop long-term support of chosen altruistic causes. Organizations will vary in the desired outcomes of selected CRM strategies, and many may find it difficult to maximize the return on investment. A firm may engage in a one-time campaign to take advantage of a prevalent movement and benefit from immediate positive publicity. Conversely, firms may choose to participate in long-term support to build a stronger brand identity and association with a desired cause or result. The goal of this research is to determine the optimal type of CRM strategy to maximize firm performance relative to the firm's competitive environment.

Firms may engage in a one-time campaign to take advantage of a prevalent movement and benefit from immediate positive publicity, such as current business practices stressing cleanliness and disinfecting procedures. In response to Covid-19 and its variants, firms have engaged in a multitude of approaches with mixed results. Business sectors focusing on dining, entertainment, shopping, among other pubic activities have struggled to find an appropriate response to meet the growing concerns of consumers. The responses firms have taken represents a multitude of strategies focused on the short term promotion of initial responses to health concerns, others have focused on fundamentally changing business operations, revamping staffing policies, and customer service. The goal of this research is to determine the optimal type of CRM strategy to maximize firm performance relative to the firm's response in the Covid environment.

Previous research has classified the taxonomy of strategies into four main forms based on donation type: sponsorship, transaction based, joint promotion, and in-kind contribution (Gupta and Pirsch, 2006). The research in this paper relies on these four components as a basis for a proposed framework of CRM/Covid response strategies. The first strategic strategy is Single Event. This strategy is restricted to single, isolated events, that are directly attached to an organization, event, or cause. This is commonly implemented as a response to specific consumer concerns or government mandates. In the case of Covid responses this can mean an adoption of additional cleaning procedures, temporarily limiting customer access, or even the lack of response and conducting "business as usual". The second strategy is an intermittent response. This strategy involves an organization implementing additional safety measures or policies during a specific time frame to raise awareness of its standardized response and reduced response implementation time. The third type of strategy is a long-term shift in business operations. A long-term strategic shift involves the organization fundamentally changing aspects of business models in response and advertising initiatives and focuses on the response as a means of conveying the change in operations to reflect the concern for public safety. The content of this message reflects the organizations desire to communicate new safety policies and options available to consumers. The final strategy is to make CRM part of the organizations core identity. These organizations have made a particular CRM initiative a part of the business model since inception or have adopted a permanent campaign.

New Era in Correctional Management: The Oncoming Dilemma of Hospice and End-of-Life Processes.

Oral

Dr. Tony Daniel [1]

1. *Reinhardt University*

Prison officials are faced with an aging inmate population who brings a variety of special medical needs. The standard of medical care required by case law demands special programs for the aged inmate. Due to a variety of reasons, including sentencing guidelines and long-term sentences (i.e., life sentences), the options of release have diminished leaving the need for palliative and hospice programs for inmates. As the need for such specialty programs increases, prisons are inept for such programs due to the many moving parts of such programs within the wall of a security-controlled environment. This paper produces a valid theoretical model that addresses the need and implementation of palliative and hospice care for inmates who are entering end-of-life. Considerations are given between two paradigms, the compassion model by healthcare providers and the security-minded officers, for which the model addresses. The model addresses the comparison between in-house programs for end-of-life care and the alternative of compassionate release, along with the importance of partnerships for both.

PERCEPTIONS OF STUDENT INTERNSHIP EFFECTIVENESS: AN ASSESSMENT STUDY

Oral

Dr. Edward Showalter [1]

1. *Randolph-Macon College*

Outcomes assessment and measurement continue to be of growing importance in all areas of higher education. Experiential learning such as internships adds additional challenges as student learning objectives and outcomes often vary from one experience to another (Abrudan et.al, 2012; Baron, 2020; Brodie, 2007; Costley, 2007, Gordon, 2002; Nghia, 2018). An assessment instrument used across several years provides an opportunity to determine if the intern's perceptions about aspects of their internships have changed over time. The authors presented selected results approximately a decade prior to the current study looking the relationship between student's perceptions of the internship itself, the personality variables of Self-Efficacy and Growth Need Strength. The earlier study showed no significant differences between male and female respondents within the relatively small sample (< 150), and limited results correlating internship perceptions and the measured personality variables. The key research question is how much of the variance in assessment scores a result of differences in the experiential learning activity versus how much is attributable to another measured factor.

A one-month internship is available as an academic option during Fall and Spring Semesters, Summer term and a one-month January term at a nationally ranked liberal arts college. These students work full time for the month of January or part time for the entire semester. Summer internships may be full or part time depending on the placement. All internships require between 130 and 160 hours of work, below 130 hours no academic credit is rewarded. The majority of the academic internships are unpaid and receive three-hours of academic credit within the department offering the internship. In addition, academic internships satisfy the college's "Experiential" general education requirement, and in some majors the internships satisfy the collegiate "Capstone" requirement. In the past two terms a paid option has been added that receives one hour of academic credit but also satisfies the collegiate requirements. All interns are required to have a faculty internship supervisor as well as a site supervisor and to turn in supplemental reports to their faculty supervisors which provide the bulk of the material used to assign the grade. As unpaid interns eliminate the variable of pay factored into their evaluations, they provide a unique control sample to compare against those interns who receive monetary compensation.

Due to the increase in virtual workplaces over the last several years (exacerbated by the massive move toward distance work during the response to the Covid-19 Pandemic), there has been a corresponding increase in virtual internships. This study does include a question as to whether the participant's internship had a virtual component. Exploratory analysis will consider if substantive response differences exist between in responses between those with virtual components and those without.

HYPOTHESES AND METHOD

The current sample is the set of interns who have completed their internships between the Fall or 2017 and Summer of 2021. The entire sample will be surveyed concurrently with an expectation of greater response from the more recent interns. There are 740 potential respondents 58 of whom completed more than one internship. Each intern will be sent an e-mail to their college e-mail address with a copy of the informed consent and a link to the on-line survey instrument. A follow-up email will be sent to each of the potential participants 14 days after the initial e-mail. No personally identifiable information is collected. Participants are asked in what area they completed their internship (usually their major) as well as the year and term.

Participants will provide an assessment of learning based on Gordon (2002), measures of Growth Need Strength (Hackman & Oldham, 1980), Self Efficacy (Sherere et al. 1982), and a ranking of five potential expectations they had for their internship: *Relationship building with my supervisor, Experience in the industry, Potential for future employment with the company, Potential reference or referral for future employment, and Grade and/or academic credit*. Participants will also respond in a short paragraph to two questions from Herzberg modified to be specific to the internship experience (Herzberg, 1959): "Briefly describe the most satisfying experience you encountered at work during your internship" and "Briefly describe the most dissatisfying experience you encountered at work during your internship."

The measures of Growth Need Strength and Self Efficacy will be scored by the using the key provided with the scales. The rankings of expectation are used as provided by the interns. Data analysis will employ simple statistical methods including correlation analysis to test the relationships between Growth Need Strength and Self Efficacy, expectations from the internships, as well as perceptions of learning outcomes. Several preliminary hypotheses follow stated in null form.

Hypothesis I: Rankings of Internship Expectations will be independent of Growth Need Strength.

Hypothesis II: Rankings of Internship Expectations will be independent of Self Efficacy.

Hypothesis III: Rankings of Internship Expectations will be independent of Internship Term.

Hypothesis IV: Learning Outcome Perceptions will be independent of Growth Need Strength.

Hypothesis V: Learning Outcome Perceptions will be independent of Self Efficacy.

Hypothesis VI: Learning Outcome Perceptions will be independent of Internship Term.

CONCLUSIONS

A previous study in 2002-2003 resulted in student intern responses broadly consistent with Herzberg's theory of motivation although supervision and interpersonal relations emerged as a motivator rather than as a hygiene factor. Growth-need strength and self-efficacy did not emerge as highly correlated with expectations. The main emphasis in this study is on perceptions of learning outcomes and expectations and the correlation strength between outcomes and growth-need strength scores.

PERSPECTIVES ALONG THE TOURIST-RESIDENT CONTINUUM, THE CASE OF MYRTLE BEACH SOUTH CAROLINA

Oral

Dr. Taylor Damonte [1] ***, Prof. Robin Harvey*** [1]

1. *Coastal Carolina University*

In resort areas first time tourists on short stays can ultimately become permanent migrants. This study hopes to increase understanding of the perceptions of what is good or bad about a destination by tourists and by residents. To learn about how perspectives can vary for residents versus tourists researchers surveyed attendees at performing arts events on the campus of a University located in the Myrtle Beach area of South Carolina, a popular resort destination area on the south Atlantic coast of the United States. The study is important as the transition to resident can have permanent economic impacts.

Prediction of Fetal Health Based on Fetal Heart Rate and Uterine Contractions Using Machine Learning Tools

Oral

Mrs. Neda Koszyk [1], ***Dr. Faleh Alshameri*** [1]

1. *Marymount University*

The most common measurements taken during pregnancy are fetal heart rate (FHR) and uterine contractions (UC). The purpose of this research paper is to determine if supervised machine learning methods can reliably predict the health of a fetus by analyzing the fetal heart rate and uterine contraction data. The dataset used in this research consists of 2126 cases with 21 different features, out of which 1655 were classified as Normal, 295 Suspect, and 176 Pathologic. We conducted a comparison analysis using multiple machine learning algorithms such as decision tree, random forest, support vector machine, k-nearest neighbor, naive Bayes, and multi-layer perceptron. The results indicate that fetal health can reliably be determined by some models; however other models do not perform well at all. The best performance came from the random forest model, which had an accuracy score of 0.937, recall of 0.864, precision of 0.925, and F1 of 0.892. On the other hand, naïve Bayes is the worst model.

PRODUCT HARM CRISIS – CAN FIRM PROMINENCE REDUCE ITS EFFECTS?

Oral

Dr. Cherie Rains [1], ***Dr. Derek Ezell*** [2]

1. *Lander University,* ***2.*** *University of Tennessee at Martin*

Companies are seeing more and more coverage, especially with an increase in social media platforms and usage, of a product-harm crisis (PHC). A product harm crisis is defined as a "discrete, well-publicized occurrence wherein products are found to be defective or dangerous" (Dawar and Pillutla 2000, p. 215). This was previously related to products being recalled, but the definition takes on much broader terms as consumer resistance takes on many forms in today's environment, such as boycotts and online petitions. Companies take great care and resources in PHC prevention, as they are known to have to have negative impacts on both brand preference and advertising effectiveness. These impacts could have lasting consequences, especially for companies with vast product lines that are likely to be more at risk. Firm performance could be hindered through various aspects of a company including new product introductions, strategic alliances, and competition – which are the direct effects in this study. This research proposes a moderating effect of firm prominence on these direct effects. Even though firm prominence is not a new topic across several business disciplines, marketing has yet to utilize this as a predictive construct, therefore this research hopes to add to the scarcity of firm prominence in the marketing literature.

Reference:

Dawar, Niraj, and Madan M. Pillutla (2000), "Impact of Product-Harm Crises on Brand Equity: The Moderating Role of Consumer Expectations," Journal of Marketing Research, 37 (2), 215–26.

Revisiting the concept of Lean/Just-in-Time Hiring in a post-COVID 19 unskilled labor environment.

Oral

Dr. Matthew Peters [1]

1. *Lander University*

Lean or Just-in-Time Manufacturing has long been established by major manufacturers as an inventory strategy that attempts to reduce costs and waste during the production process. An example of this is receiving raw materials only just as they are needed, which then reduces inventory holding costs, including expensive wait time. Recruiting and hiring practices have adopted this model in recent years and ideally, a rapid reactive hiring process to industry/corporation needs based in large part on technology has become more standard. As staffing needs change, particularly in unskilled labor, hiring managers simply look for suitable candidates in their proverbial internet ether. Societal change post COVID 19 has greatly affected this hiring paradigm. Due to a variety of political, social, and economic forces unskilled labor has become increasingly difficult to come by. Wage stagnation, working conditions, a realization of “big picture” perspectives regarding the essentiality of unskilled labor and other factors has resulted in worker shortage that Lean Hiring has proven unable to effectively facilitate. Companies that maintained a more traditional applicant pool, carefully cultivated over time, have proven more effective at staffing post COVID 19. Smaller companies have realized that wages must be adjusted to the popular “$15” levels, and larger corporations have engaged in more creative/expensive methods: Bank of America has pledged a $25 minimum wage by 2025; Target now offers 100% Tuition and Books coverage at over 40 colleges as a benefit to all workers as a hiring and retention effort. As the labor pool shrinks and evolves, traditional, reliable, relationship-based hiring may soon return to the forefront of hiring practices, replacing the Lean/Just-in-Time models so ubiquitous in the unskilled hiring market.

Sentiment Analysis on tweets related to fake information about Covid-19

Oral

Dr. Maryam Mahdikhani [1]

1. *college of Charleston*

The study is motivated by the tweets related to Covid-19 with wrong or fake information from beginning of the pandemic to development of vaccines. We analyze almost 2 million tweets on Covid-19 that are written in English to evaluate each tweet's content and to identify public's emotions related to the pandemic from all over the world. We then extract the features and analyzed in each phase of Covid-19 pandemic what were the content of popular tweets. We further applied the advanced machine learning algorithm to generate a predictive model for the retweetability of posted tweets. The results of the study revealed that how public opinions have changed in response to the Covid-19 pandemic from the early stage to the vaccine-related events. Public's dominant emotion toward Covid-19 pandemic by increasing the awareness and WHO responses on the early stages was fear. By distribution of vaccines and Covid-19 control measures turned to joy. Our analysis shows tweets with higher emotional intensity including fear, anger, joy and sadness are more popular based on the number of retweets compared to informative news and information on Covid-19 pandemic. This study can help to identify the negative and misleading information that has an impact on public awareness during pandemics or other crises and recommend the informative and positive sentiment to the social media users such as Twitter.

SERVITIZATION AS A MEDIATOR OF THE EFFECT OF MARKET ORIENTATION IN FIRM PERFORMANCE

Oral

Dr. Inigo Arroniz [1]

1. *Randolph-Macon College*

The intent of this study is to better understand the role that servitization plays in marketing strategy. To this end we suggest that servitization is a strategy that implements some of the basic tenants of the services dominant logic (SDL). In particular, we argue that the service dominant logic does not replace our understanding regarding marketing strategy it just completes it. To this end we suggest that its role complements theories such as the role that market orientation has on firm performance, a role that has been studied in numerous occasions.

A concept such as servitization is closely related to the service dominant logic as servitization is the addition of services or retransformation to a service of a product or a core service. We argue that servitization is in a way a strategy that enables the move from a goods dominant logic to a services dominant logic. And in that, servitization should enable a firm to begin the journey from goods to services. Hence mediating the effect that market orientation has in firm performance.

Market orientation provides the strategic raw materials needed to successfully make the transition from products to services. Market orientation provides the insights that are essential to understand how to co-create the value through servitization that enables the firms to succeed in the marketplace.

Another mechanism that translates the positive effects of market orientation to firm performance is propensity to innovate. The better understanding of the marketplace and its components should enable a higher rate of new product launches. Given that market orientation provides superior understanding of customers' preferences and enables companies to adapt better to these preferences we posit that this will translate in greater success when launching new products or services.

Technological adoptions are crucial in the pursue of both efficiency and knowledge /information transfer. Commonplace IT technologies today, such as smart phones, cellphone service and the internet) enable firms to offer unique services that enable then to co-create value together. For example, an online store enables the consumer to select the perfect unique bundle of products and maybe services from the convenience of his or her home. This ubiquitous scenario is enabled and facilitated by the degree towards which the firms adopt said technologies.

Finally, both degree of servitization and propensity to innovate create additional value for the consumer. Servitization by doing a "job" for the consumer in the form of a service and innovation by creating new value that was not present before. They both enable the differentiation of the offering that enables the firm to sustain superior performance.

The setting for the data collection is retailers in Spain. Data was collected using CATI (Computer Aided Telephone Interview), using a structured survey for each of the interviewees. In all cases the key informant was the owner or manager of the retailer. We collected over 700 responses from two geographically distinct areas, a rural area and a metropolitan area.

We conducted a series of structural equation models to analyze the proposed effect of servitization as a potential mediator of market orientation on innovativeness and ultimately on firm performance. The selected model provides a series of test that are to a large degree consistent with our hypotheses. The overall model fits the data well and shows good psychometric properties. Through a series of nested model testing, we find empirical support that at least some of the market orientation effects in innovativeness and firm performance are mediated by servitization.

Student Performance in Online and Face-to-Face Classes: Impact of COVID

Oral

***Ms. Mary Dittman* [1], *Dr. Caroliniana Padgett* [1], *Dr. Elizabeth Sharer* [1], *Dr. Hari Rajagopalan* [1]**

***1.** Francis Marion University*

There have been many dire predictions about online education sweeping aside traditional universities and revolutionizing higher education. While online education has made a huge impact at the graduate level, it has yet to make much impact at the undergraduate level. The COVID-19 pandemic has forced many universities go online, there have been many questions on the efficacy of online undergraduate education. There are many arguments put forth that undergraduate students in online education, particularly under-prepared and disadvantaged students, underperform and, on average, experience poor outcomes. In this paper, we investigate whether there is a difference in student performance in the face-to-face and online classes during a normal semester. We then look at student performance during Spring 2020 where we had to move online mid-semester. Was student performance different from a normal online class to a face-to-face class which was switched online?

SUPER-EFFICIENCY DATA ENVELOPMENT ANALYSIS APPROACH TO DISASTER RELIEF SUPPLY CHAIN NETWORK SYSTEM WITH MULTIPLE OBJECTIVES

Oral

Dr. Jae-Dong Hong [1]

1. *South Carolina State University*

Disaster relief supply chain (*DRSC*) or humanitarian supply chain (*HSC*) plays a critical role in providing disaster relief items such as first aids, drinking water, food, and daily commodities to alleviate people's suffering. These two terms, *DRSC* and *HSC*, are frequently used interchangeably. This paper studies a multi-objective disaster relief supply chain system model, which would play a critical role in timely disaster relief items. The data envelopment analysis (DEA) method is applied to identify efficient *DRSC* system configurations among the proposed schemes. Super-efficiency data envelopment analysis (SE-DEA) is applied to overcome the weakness of the classical DEA method. The idea of super-efficiency (SE), mainly developed by Anderson and Peterson (1993), is that a decision-making unit (DMU) under evaluation is not included in the reference set of the C-DEA models, and then with its inclusion. Notably, the SE-DEA model has significance for discriminating among efficient DMUs, as Anderson and Peterson (1993) demonstrate. Charnes et al. (1992) use the SE-DEA model to study the sensitivity of the efficiency classification. But the critical issue of using the model is that the adjacent DMUs decide the SE score (SES) of an efficient DMU, so it would be unreasonable for DMUs to be ranked by the SESs. This study presents how to apply SE-DEA methods effectively for designing efficient and robust *DRSCS* configurations. Through a case study, the applicability of the proposed procedure is demonstrated. Using the actual data available for South Carolina, we present the proposed methods to evaluate DRSCS configurations generated by the multiple-objective model. Surprisingly, the proposed methods reveal some hidden efficient network configurations that the regular DEA model alone can't identify. We observe that the proposed approach can be used as an essential tool for designing the DRSC system and other supply chain network systems with multiple inputs and outputs.

SUPPLY CHAIN RESILIENCE AND THE ROLE OF FIRM INNOVATIVENESS

Oral

Dr. Sergey Ponomarov [1]

1. *The Citadel*

This research investigates the relationship between firm innovativeness and supply chain resilience within a supply chain disruptions context.

Despite its potential benefits in wide range of circumstances, firm innovativeness received scant attention in relation to risk management. Likewise, a system view of resilience was overlooked in the strategic management literature. This research focuses on exploring the relationship between firm innovativeness and supply chain resilience in an attempt to incorporate supply chain resilience to strategic management and facilitate bridging the gap between innovation and supply chain risk management research streams. The moderating role of supply uncertainty and interdependence in the focal relationship was also hypothesized and tested. Findings suggest that firm innovativeness is positively associated with supply chain resilience, and supply uncertainty negatively moderates this relationship but interdependence does not. We argue that this could be due to dual nature of interdependence in networks.

A dynamic capabilities theory, serving as a theoretical lens, facilitates the discussion on the nature of firm innovativeness and supply chain resilience and informs the development of the proposed conceptual model.

Supply Chain Risk Management using AI Technology

Oral

Dr. Binshan Lin [1]

1. *Louisiana State University Shreveport*

This paper draws on existing literature on artificial intelligence for supply chain risk management (AIRM) and resource-based view (RBV) to conceptualize an analytics model for supply chain re-engineering (RP) and supply chain agility (SCA) during and post Covid-19. The model is tested based on data collected from small-medium enterprises in which the majority of respondents are executives, managers and senior managers. The significance of the conceptual model is studied using partial least squares-based structural equation modelling (PLS-SEM) to study the significance of the conceptual model.

The findings of the study identified AIRM influences RP and SCA. Further, RP affects and mediates SCA. This study advances current literature on resource-based view and usage of artificial intelligence technologies for supply chain risk management in SMEs.

Systematic Application of Service Operations Management Principles to Improve Student Engagement and Satisfaction

Oral

Dr. Elham Torabi [1], ***Dr. Baback Vaziri*** [1], ***Dr. Amy Connolly*** [1]

1. *College of Business, James Madison University*

Students complain that technical courses like operations management are boring, dry or unenthralling. If we characterize classroom learning between a student and an instructor as a knowledge-intensive service encounter, then students are a kind of "internal customer" who must interact with the classroom system and play a key role in their own learning. Without engagement and a modicum of satisfaction, student learning plummets. In order to overcome students' negative perceptions of the learning process in an operations management course, we applied tried and true principles from service operations management (SOM) to design a better service experience that is more engaging and interesting. We surveyed students in three phases across two different modalities to identify and test key components from SOM that might impact student learning (e.g., customer contact theory, the gap model of service quality, and the psychology of waiting) and linked these components to important suggestions for increasing engagement in the classroom. We then tested how applying the SOM framework improved student satisfaction as measured by assessment of learning and student evaluations. We discovered that applying service design principles to the learning process provided a systematic way to improve students' perceptions of learning without sacrificing rigor.

Teaching Blockchain

Oral

Dr. Caleb Bradberry [1]

1. *Radford University*

Blockchain technology is the underlying data structure that makes cryptocurrencies like Bitcoin and Etherium work. With the rise of value of Bitcoin and interest in cryptocurrency comes a rise in interest at the collegiate level to learn more about these technologies. While cryptocurrency is driving the current interest in blockchain, it holds potential to disrupt sectors beyond finance, including healthcare and secure transmission of protected health information. However, the nature of blockchain does not easily lend itself to being taught outside of an interdisciplinary approach. This research examines the underlying conceptual requirements to successfully teach the blockchain technology.

TEACHING DATA SCIENCE: FROM TECHNOLOGICAL REQUIREMENTS TO MANAGERIAL RECOMMENDATIONS

Oral

Dr. Caleb Bradberry [1], ***Dr. Jeff Pittges*** [1]

1. *Radford University*

As more firms seek to leverage data that is generated in their day-to-day operations, the demand or data professionals far outpaces the supply. Universities over the past ten years have been working to develop curriculum to address this need. Various academic disciplines within universities are working to develop new approaches to handling this data-driven world: statistics provides the underlying theoretical basis, computer science provides a vast array of technologies from SAS and SPSS to R and Python, business management provides the value proposition of analyzing the data, just to name a few. With such a diversity of topics ranging from theoretical statistics to applied business intelligence, a wide range of topics can be covered to teach the area of data science. This paper examines conceptual and applied topics that appear in overlapping curriculum to better understand what is being taught.

The Impact of Data Requirements on an Emergency Software System for a Quick Response Program.

Oral

Dr. Abdulaziz Bahha [1]

1. *Lander University*

The purpose of "The Impact of Data Requirements on an Emergency Software System for a Quick Response Program" is to effectively operate the whole emergency system so that any incident or accident can be dealt with in a quick response and with limited delay. The system is a computer-based system so that we can achieve speed as well as accuracy in police work. At present the processes in the emergency system are manual. Some of the processes are mentioned below:
Whenever an incident occurs involving only a policeman or an informer, information about the incident goes to different police stations. Hence, there is no problem with communication and of course action. It is very difficult to track down the vehicle available and its position. It is a paper-based system, so more time is needed to find out pertinent information. In spite of that, the information cannot be shared on a regular basis. The same problem is happening with tracking the special vehicle available at a different police station. When the incident occurs the policemen are not getting proper information about the availability of the special vehicles and machines.

THE IMPACT OF THE COVID-INDUCED SHUTDOWN ON LEARNING:THE MEASURABLE EXPERIENCE OF ONE BUSINESS PROGRAM

Oral

Dr. John White [1], ***Dr. Anna Hickey*** [1]

1. *US Coast Guard Academy*

In March 2020, many colleges and universities quickly transitioned to remote teaching as a result of the COVID-19 pandemic. Instructors scrambled to deliver their courses in any number of methods, from e-mailing topic summaries to their students to developing videos of lectures, either live or in an asynchronous mode. The question of the effectiveness of the instruction that occurred during this disrupted semester has been the subject of numerous anecdotal reports. This study attempts provide an empirical analysis of the teaching effectiveness at one particular institution by comparing the score on the Educational Testing Service's Major Field Test in business taken in 2021 with the past scores.

THE IMPACT OF VIRTUAL EXPERIENCE ON ACADEMIC EXPERIENCE

Oral

Dr. Ruth C. King [1], ***Dr. Su Dong*** [1]

1. *Fayetteville State University*

This study examines the impact of college students' smartphone use on their academic experience. Applying the attachment theory, we examine the effect of students' attachment with their smartphones on their academic performance, academic persistence, and social wellbeing. Current research on smartphone usage have generally focused on problematic smartphone overuse, compulsive usage, or smartphone addiction from a clinical perspective. Our study introduces attachment theory to understand the smartphone behavior from a theoretical lens.

Although attachment theory has traditionally been applied to understand the bonding relationships between humans, the theory has since been applied to study relationships between human and objects such as shoes, purses or stuffed animals. This theoretical extension helps understand the individuals' relationships with their smartphones. Ainsworth (1985) described four key features that appear in attachment relationships. They are (1) proximity maintenance, (2) attachment target as a safe haven, (3) attachment target promotes confidence and (4) separation anxiety when parting with the attachment. These attachment characteristics provide a basis to explore the attachment relationships between human and objects such as smartphone.

We preliminarily operationalize this construct as time spent on using the smartphone. The more time an individual uses the smartphone, the more attachment or connectivity is established between the users and the smartphone. By investigating the extent of time an individual uses the smartphone, we can also understand the degree of attachment an individual demonstrates with his or her smartphone and its impacts.

Our research explores the impact of college students' use of smartphone on various online apps on their academic performance, academic persistence and social well beings. Our three hypotheses are: The more time an individual spends on the smartphone, (1) the higher their academic performance; (2) the stronger their academic persistence and (3) the better social well beings

Our preliminary results show support of our hypotheses.

The Impacts of Pandemics on the Role of Power in Service Quality

Oral

Dr. Daisy Wang [1], *Dr. Jasmin Lin* [2]

1. East Stroudsburg University, 2. Robert Morris University

Several studies argue that high service quality would lead to high customer satisfaction and high retention rates or purchase/repurchase intentions. However, not everyone is treated with the same level of service, or customers perceive service quality differently based on various power dependencies. When the customers are less powerful than the service provider, low service quality would be expected to lower the purchase intentions. Nonetheless, the purchase actions would likely still occur since the customers depend on the service provided by the firm. On the other hand, when the customers are more powerful than the service provider, high service quality and consequently high purchase intentions may not necessarily lead to purchase actions. In addition, firms with more power tend to provide low service quality while firms with less power tend to be more inclined to provide better service. Therefore, power imbalance leads to different service quality.

The COVID-19 pandemic has changed some power dependencies between service providers and customers. We would like to discuss these changes while exploring the relationship among factors. In this paper, we claim that the relationship that purchase intentions lead to purchase actions is potentially moderated by power dependence.

The Influence of Central Bank Behavior on US Interest Rates

Oral

Prof. Jim Winder [1]

1. *Rutgers Business School*

The research will begin with a basic supply/demand model for US interest rates based on sector holdings, using Federal Reserve Flow of Funds data. This basic model will serve as the foundation for more complex models later in the paper. The purpose of this analysis is to identify the sectors, including the Fed, that have the most significant effect on the level of US interest rates. Next, I will develop a simple model that identifies which regional groupings of central banks have the most significant effects on the level of US interest rates.

The third component of my research will be to develop an OLS model that incorporates US sector demand, inflation expectations, and global supply/demand forces into a model of US short-term and long-term rate levels. The global supply of funds will be proxied by the Asian savings glut, while global demand will be proxied by world real GDP growth. This model will US Federal Reserve data, in addition to data from the IMF's World Economic Outlook data base. Inflation expectations will be extracted from the comparison of nominal US Treasury yields with Treasury Inflation Protected yields.
Perhaps, the most interesting part of my project deals with the question: "Has Quantitative Easing been successful?" And how much higher would US interest rate levels be if there had been no renewed QE in response to the Covid-19 pandemic? I will also use this model to estimate what the future path of US interest rates might be when the Fed begins to, at first, stabilize the size of its balance sheet and, then, begins the process of unwinding some of the incredible balance sheet expansion that has occurred over the past 13 years.

THE LOST DECADE: WHAT DOLLAR COST AVERAGING OVERCOMES DURING THE SUPPOSEDLY FLAT DECADE OF S&P 500 STOCK MARKET INDEX RETURNS.

Oral

Dr. James Benton [1]

1. *College of Coastal Georgia*

Anyone who follows the overall US stock market and its respective indices will tell you there is a plethora of information streaming from financial news outlets 24/7. Many of these outlets tell part of the story but seldom the whole story. This is partly due to reporting financial news as it is happening versus the benefits of hindsight and analysis of data that has taken place. Many a financial news outlet has talked about the lost decade of S&P 500 Stock Market Index returns during the 2000s. They reference a decade or more of where the S&P 500 would have provided a flat 0% return. An example of this is where the S&P 500 was at 2,385 in August of 2000 and had its ups and mainly downs until December 2014 when it again reached 2,382. This would have gained a 0% return over that period if you had invested a lump sum of money in the S&P 500 and just waited during that time period. However, that is not how the vast majority of investors invest, especially those investing periodically in their 401K/403B/457/IRAs plans. We look at a one-time investment return during this period and compare it to the same amount of money invested periodically (Dollar Cost Averaging) into an account over the same time period. This shows the power of Dollar Cost Average investing for the average investor saving for retirement.

THE ORIGINAL AND ALTERNATE KNOWLEDGE CORRIDORS: WHEN IDEOLOGY MAKES PROBLEM SOLVING MORE ELUSIVE

Oral

Dr. William Crandall **[1]*****, Dr. Richard Crandall*** **[2]*****, Dr. Susan Crandall*** **[3]**

1. *University of North Carolina at Pembroke,* ***2.*** *Appalachian State University (retired),* ***3.*** *Sandhills Community College*

The original knowledge corridor depicted how data moved to information, then to knowledge, and finally to wisdom. This paper presents the alternate knowledge corridor, a framework that commences with the confrontation of one's ideology and ending with its that same ideology being confirmed. We examine both knowledge corridors and how they can work against each other. We conclude the paper with implications for "everyone".

THE POTENTIAL IMPACT TO ENTREPRENEURIAL ACTIVITY DUE TO THE COVID-19 PANDEMIC

Oral

Mr. Gregory Shaff [1], ***Dr. Charles Smith*** [1]

1. *Roanoke College*

COVID-19 had a terribly detrimental impact on the global economy, and unemployment in the United States rose sharply as a result. This paper attempts to provide insight into the potential for an increase in entrepreneurial activity due to the currently high levels of unemployment and looks into the potential impacts to new business applications, based on current governmental policies, such as supplemental federal unemployment benefits paid to the unemployed. Further, several different research studies on the entrepreneurial initiatives that took place in the wake of the Great Recession and the Great Depression are analyzed and discussed to determine if entrepreneurial activities may be primed to increase. Findings suggest that the overall number of small businesses is likely to decline in the face of the COVID-19 crisis due to the unfavorable economic conditions, but new "necessity" entrepreneurs are likely to be on the rise. Entrepreneurial educational opportunities are suggested in an effort to aid these new entrepreneurs to achieve success.

Toss the Text: Microlearning in the Classroom

Oral

Dr. Leann Mischel [1]

1. *Coastal Carolina University*

There are many who believe that higher education is in desperate need of a disruption. It seems like we have taught classes the same way since the beginning of time – we guide students through a text and give them classroom lectures and activities to reinforce what they read at home. More recently, instructors have successfully gone to a flipped classroom. Students are more receptive to the flipped classroom format since they can review the material and lectures on their own and spend classroom time engaged in immersive activities. However, neither of these pedagogies parallel the learning style of most students today. Microlearning allows students to learn at their own pace and in small bites. Short videos (up to five minutes long) give them the essentials for learning. Quizzes and interactive classroom exercises are used to reinforce concepts and ensure learning. This technique allows instructors to eliminate the use of texts for their classes and still focus on the important concepts that need to be covered. This paper describes a microlearning along with its advantages and disadvantages in the classroom.

U.S. SMALL BUSINESSES: A QUANTITATIVE ANALYSIS OF WORKING CAPITAL MANAGEMENT AND PROFITABILITY WITHIN THE MANUFACTURING SECTOR

Oral

Dr. Michael Brizek [1]

1. *Lander University*

Working capital is a key consideration for firms of all sizes because it is often the basis for operational options. In the case of small manufacturing businesses, leaders must pay close attention to the active and successful working capital policies because they may be the difference between success and failure. Hence, prudent leaders in these businesses seek practices and principles that enhance the potential for achieving organizational growth and optimal profitability. While there is a substantial study connecting working capital to profitability in small and larger firms around the world, there is limited research on the small manufacturing firms in the United States. Thus, this study was designed to answer the research question, To what extent does the working capital management (average collection period, inventory conversion period, average payment period, and cash conversion cycle) explain profitability of small manufacturing businesses? This study was conducted using a nonexperimental, quantitative research method. The population for the research was comprised of publicly held small manufacturing companies listed on the U.S. Security and Exchange Commission (SEC) for the period from 2011 to 2015. The study was completed using archival secondary data from publicly traded small manufacturing firms' financial reports. The financial statements were balance sheets, income statements, and statements of retained earnings. The findings of the study showed there was a significant relationship between working capital and profitability. The results also showed there was a significant relationship between average collection period and profitability, while it also established there was no relationship between cash conversion cycle and profitability of small manufacturing businesses.

Using Artificial Intelligence to Detect Disinformation In Web Genres

Oral

***Dr. Silvia Bravo* [1], *Dr. Alex Mbaziira* [2]**

***1.** National University of San Marcos,, **2.** Marymount University*

In recent years, fake news has increased dramatically on social media and websites. This increase is due to the rapid flow of information, easy access and low costs offered by the Internet. Timely discernment of fake news and true news reduces the possibility that misinformation will influence public opinion, judgment, or conscience. Therefore, this study proposes models to identify fake news. We develop fake news detection models using TF-IDF for feature extraction and five classifiers namely Decision Trees (DT), Gradient Boosting (GB), Linear Support Vector Machine (SVM), Logistic Regression (LR) and Random Forest (RF). For the evaluation of the models, two data sets corresponding to social media and websites web genres were used. The models were trained and evaluated using four metrics namely: Recall, Precision, F1-score and Accuracy were used in the evaluation process. The results show that the website data set (0.99 - 1.00) and the social media data set (0.88 - 0.96) achieve high ranking rates according to the Accuracy metric. In addition, it was evidenced that the models trained with data sets from websites can detect fake news (0.97-0.99). While the models trained with social media data sets manage to detect true news (0.91 - 0.99).

Using Remember the Titans as a Tool to Teach Bruce Tuckman's Five Stages of Group Development to Management Students

Oral

Dr. David Fowler [1], ***Dr. Jon Musgrave*** [2]

1. Lander Univ, 2. Morehead State University

This is an ongoing research project to quantify classroom performance improvement by utilizing the movie *Remember the Titans* as a tool to teach Bruce Tuckman's five stages of group development. Results data has been gathered during the previous three years and performance improvement has been achieved.

Virtual International MBA Study Tours as an Alternative to Physical Tours in a Time of Global Pandemic

Oral

Dr. Raymond Jacobs [1], ***Dr. Elad Granot*** [1], ***Mr. Jacob Moss*** [1], ***Mr. Ronald Mickler Jr*** [1]

1. *Ashland University*

Ashland University (AU) located in Ashland, Ohio, offers a 1-Year International Master of Business Administration (MBA) program. This program is designed for working professionals and affords students the opportunity to earn an accredited MBA in 12 months. A key component of this program is the inclusion of two international study tours. The goal of the study tours is to introduce students to different business environments and cultures outside of the United States to help them experience multiple countries' business environments and culture. When COVID-19 led to a global pandemic resulting in worldwide travel bans, this caused a major problem in AU's ability to deliver this component. The solution was to develop a virtual international study tour. The design of the virtual international study tour included gamification and augmented reality to enhance the student's learning experience and successfully introduce them to international business and culture. This paper will focus on the requirements and components of the virtual international study tour and how the addition of gamification and augmented reality concepts positively influenced the student learning objectives.

WHAT IS EQUITY, WHEN, YEARS AFTER IT PURCHASES A NOTE, PENNYMAC, AS A CREDITOR, SUES TO REFORM THE DEED OF TRUST SECURING THE NOTE?

Oral

Dr. Brad Johnson [1]

1. *Francis Marion University*

The Anglo-American system of equity jurisprudence is not infallible. There are many traps for the unwary that are easily exploited by unscrupulous persons who (a) are more knowledgeable of such a system and (b) have greater resources. A court has equity jurisdiction to reform a written contract, as long as one of the parties to such written contract alleges that the written contract does not embody the agreement between the parties due to a mutual mistake. This doctrine of equitable reformation is "*a doctrine for the legally maladroit*." *Baynes, infra*. The objectives of this article are to (1) establish the law with regard to an equitable reformation claim, (2) apply said law to the factual background of a case study, for the purpose of demonstrating that the equitable reformation claim of PennyMac in the case study is meritless and only brought for an evil motive. This article argues that if the objectives of this article are satisfied, PennyMac, and a multitude of its stakeholders, will have an increased understanding that PennyMac's current conduct in operating its loan servicing business may result in violations of a variety of state common laws and federal statutory laws. Furthermore, this article argues that such increased understanding, and the implications thereof, will likely motivate PennyMac to modify its business model in operating its loan servicing business, which will result in imminent changes to the manner in which PennyMac conducts its loan servicing business.

What Should Students Know and Be Able to Do After Your Data Analysis Class?

DASI Session

Dr. Ping Wang [1], ***Dr. Wilma Andrews*** [2], ***Dr. John N. Dyer*** [3], ***Dr. Fatemeh Valizadeh Gamchi*** [2], ***Dr. Bharat Kolluri*** [4], ***Dr. Ning Jia*** [4]

1. College of Business, James Madison University, 2. Virginia Commonwealth University, 3. Georgia Southern University, 4. University of Hartford

This will be an interactive session with attendees and a panel of individuals who have a variety of experiences instructing classes with a focus on the use of data. Discussion in the session will address an introductory class or a sequence of classes, but many of the items can apply for other classes also. The goal for the class should be to prepare students for an analytics environment where data are analyzed to obtain facts and insights that will used by decision makers for managing the processes they oversee. Potential topics to consider and discuss will include computational analysis methods; computational software; theory for the covered methods; types of data to be analyzed; texts and learning support materials; homework, tests and project assignments; class structure such as a flipped classroom; visualization; asking the appropriate questions to obtain understanding of the problem; communication of results to a decision maker in language they can understand; knowledge of current terminology; demonstrating the value of data analysis; creating a passion for analysis: and dealing with the most challenging areas.

Often, what gets taught in a class is what the faculty know best or what is in a textbook. The focus is to lay out elements of a learning environment that would best prepare students for what they will need to know and be able to do as they move forward. Moving forward should include subsequent classes and employment that will use what was learned in the class.

Relative to the focus of the session, Steve Weiss, Content Manager, Data Science & Business Analytics at LinkedIn answered similar questions in the whitepaper, “The 2021 Marketing Analytics and Data Science Community Outlook.” [https://assets.informa.com/connectls/MADSIMI/MADS_Whitepaper_2021.pdf?_ga=2.179662052.130871293.1628782052-852720312.1628782052] (Bold faced text is used to emphasize points germane to this session.)

What is the number one skill that is needed to succeed in the second half of 2021 and beyond? “Hard skill: Teaching basic statistics to everyone in an org. **We’re talking about how statistics work**, not necessarily requiring every last person to suddenly develop high math skills. As all businesses realize they are inherently data businesses at some level, **everyone needs to be on the same page and speaking the same language, understanding the data-driven rationale for where leadership is taking their companies … and doing this is much, much easier if everyone appreciates how data sets work, what variability is, the fundamentals of probability.** There’s an extra benefit to doing this: **A surprising number of people who hate math and don’t think they can grasp statistics become totally fascinated by how numbers and data actually work, once they receive competent instruction. These newly-won data fans can become your org’s strongest advocates for evangelizing the data message to everyone else in (and outside) your business.**

How can you become a stronger analyst/data scientist?

I'll point to two trends I'm seeing from my perspective at LinkedIn Learning**: The importance of domain expertise, and the importance of collaborative and communication skills. Domain expertise equates to being able to bring deeper and more immediate impact**. As more and more candidates who show some level of data/analytics expertise enter the workforce, how can you set yourself apart? Your advantage may be in your specific area(s) of applied industry knowledge and expertise. Because after a point, the data work being done in, say, the financial industry, isn't the same–from a practical perspective–as what's being done in marketing.

Communication skills comes at this from the other direction but still relates**: We need data experts who can comfortably and effectively collaborate with everyone else in their orgs."**

He points out the importance of understanding how statistics work but not the associated math. As an instructor it is more challenging to test a student's understanding of how a statistical procedure works than testing how well they can do the math. He also identified the differentiating skills of domain knowledge and effective communication that may be overlooked in many data analysis classes.

This session will hopefully present some ideas/areas of importance for those attending to consider implementing in their data analysis course.

Who is my mentor? Establishing formal mentoring programs through organizational alignment, social exchange, and self-determination.

Oral

Dr. Ryan Kentrus [1]

1. *Frostburg State University*

This workshop will discuss the development of a formal mentoring program model that can be used to increase employee engagement and leadership development among faculty and staff in the university setting. The framework and implementation strategies that were used in this process will be presented so that they can be emulated in other institutions. This will be accomplished through a formal presentation, workshop activities, and discussion/question and answer session. Using organizational alignment theory, social exchange theory, and self-determination theory, we have developed a successful framework and approach to engaging employees and developing leaders through mentoring that others can apply at their institutions.

Zoom University, Student Perspectives and Directives for the Future of Online Delivery

Oral

Dr. Suzanne Collins, DBA [1], ***Ms. Karen Ward*** [2], ***Dr. Jared Hansen*** [3]

1. *University of North Carolina at Charlotte,* ***2.*** *University of North Carolina at Greensboro,* ***3.*** *Utah State University*

This research advances knowledge related to the permanence of change for educational delivery as an outcome of the COVID-19 Pandemic. Although throughout the pandemic, continuous modification was not optional as situation evolved, the experience has yielded formative change as Universities move back into the classroom, or not. Our journey to discovery of the student viewpoint began in the Fall of 2020, when the semester was filled with the hope that a return to the classroom may be in store. However, as this expectation was quickly dashed and students returned to the seemingly permanent situations from which they has fled from from in May 2020, known by most as as “Zoom University”

The student body had aptly provided the not so flattering monikor that perfectly captured sentiment; portraying the university system as a one-size-fits all experience which in fact, fit no one. Thus, this prompted the research question, what needs to change. Therefore, this research began through qualitative research that surfaced themes through online focus groups. Subsequently the research moved forward to gather quantitative sentiment from over 425 students over the next 18 months. Sentiment was tested through structural equation modeling (PLS-SEM) for respondents attending both two and four year institutions. Themes revealed that student consumers were exhausted and overwhelmed by full-session lectures, time-filler assignments, a lack of communication and organization and maintained that general disconnect from the University community was rampant.

First, this research will discuss the top themes generated from qualitative research using multiple online focus groups. Second, we will reveal theme priory discerned through sentiment survey. Third, we will examine tactics which emerged as a result of sentiment; e.g., flipped classrooms, increased use of breakout rooms, industry expert guest speakers, etc. Finally, the authors will provide guidance for both in person and online delivery based on the outcomes of adaptations.

Papers

A BRIEFING ON RISK BASED CAPITAL ACCORDS FOR SMALL ACCOUNTING FIRMS: AUDIT PERSPECTIVES FOR COMMUNITY BANKING INSTITUTIONS

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Abstract

This paper examines the rapidly changing global banking system and the Basel Committee attempt to implement a regulatory framework for the international banking business. Established in 1974 the Basel Committee on Banking Supervision (BASEL) has since issued three major publications known as BASEL 1 (1988), BASEL II (2004) and BASEL III (2009) which are focused on managing and establishing minimums for the risk based capital accounts in Banks that operate globally. The research looks at the challenges and benefits of the rules based approach used by Basel vs. the principle-based decision making used by many regulators in countries around the world.

INTRODUCTION

In the past fifteen years, with the collapse of the U.S. housing market and subsequent global recession, many governments have refocused attention on international finance, specifically zeroing in on regulating and controlling global banks. Government officials are being called on to increase regulatory oversight and the emerging economies are pressing harder than ever (many of which often suffered economic adjustments more perilous than developed economies during the recent global recession) for a say in how the international financial systems are managed and regulated (Sundaram, 2011). These regulatory suggestions have taken many forms and directions. Some have gone so far to suggest the core of a bank must be publicly owned in order to manage the risk because the capital position in banks can never be high enough to absorb major losses (Janson, 2000; Sundaram, 2011). Others have suggested that market adjustments are part of the natural economic cycle and letting them play out will create a stronger and more robust world economy in the long term. All of this discussion is focused on managing global systemic risk with the expectation that financial markets and institutions will become more stable and balanced in their operation.

While most countries and governments agree consistent regulations and broad frameworks are the goal, designing global banking regulation is challenging and complex. Financial institution regulation tends to be iterative, with regulators establishing new parameters only to see a country experience another financial shock that was unexpected. This has meant regulation has become more detailed, complex and restrictive, leaving many financial institutions to approach these rules reluctantly or ignore them altogether. In developing countries where bank lending often drives the economy, establishing new rules that limit lending can be more damaging to economic growth than a bank failure (Blayloc, 2010). On the other hand, if the country does not implement the rules, their financial institutions will have a competitive advantage over others, meaning the systemic will move to the less restrictive country.

While there are several regulatory bodies governing international financial institutions, The Bank of International Settlements (BIS) has been at the forefront of global financial regulations for many years. The BIS is an international institution that is not accountable to any national government and is focused on promoting global monetary and financial stability and acts as a forum for discussion and cooperation (Driga, 2007). The Committee on Banking Supervision (CBS) was formed by the BIS in 1975 and is composed of central bankers and responsible for minimizing regulatory differences in global banks (Blayloc, 2010). The CBS's primary focus has been on developing guidelines and regulatory minimums for capital in banks - a concern of regulators since the 1930's (Mehta & Fung, 2004). The result of the CBS's efforts has been a series of regulatory recommendations named The BASEL Capital Accords, which establish minimum capital standards for globally active banks. These standards are not meant to usurp a country's ability to establish additional rules and requirements within their own national borders, and in fact have no legal force and are only recommendations that must be voluntarily adopted by local regulatory bodies (Buric, 2008).

These major changes to the international banking environment will most certainly trickle down to small community banks beginning as early as 2015. While it will be shown small community banks already meet, or exceed, the new BASEL banking regulations, small local CPA firms will have to become educated concerning the changes to existing bank capital structure so as to prepare professionally solid audit plans and perform appropriate audit testing to ascertain that their banking clients do in fact meet the new regulations. This article is intended to be a general overview of those new banking requirements and a jumping off point for small local CPA firms in becoming familiar with the new landscape their clients will have to negotiate in the future.

CONTEXT

THE BASEL ACCORDS (BASEL) are a consequence of the ever changing nature and understanding of international trade and a set of global politics that many are finding difficult to define and interpret. Fareed Zakaria (2008) described this global configuration in his book, *The Post American World*, as not the decline of industrial economies, but the rise of everyone else. Included in the 'everyone else' are developing nations that have historically been left behind, but are now participating, and often demanding a bigger role in global financial decision-making. Dr. Zakaria further suggests that these changes-in the long run-will be in the best interest of global citizens everywhere; however, international progress will mean compromise, and of course not everyone is ready to compromise.

While understanding that the global financial markets are changing and that a broad range of nations are playing an increasingly important role in international finance, history also provides insights into global thinking and direction. A detailed review of the literature on the Bank of International Settlements (BIS), which sponsors the Committee working on BASEL, quickly formulates the conclusion that the seeds for change in financial institution regulation were planted long ago. In 1944 the Bretton Woods Conference established the model for commercial and financial cooperation between industrialized countries. At this meeting the International Monetary Fund (IMF) was founded to monitor currency exchange rates and The World Bank (International Bank for Reconstruction and Development) was designed to provide capital to developing countries (Stephey, 2008). Although the responsibilities and task of these groups have changed over time, both the IMF and the World Bank play roles helping to determine global regulatory operating environments for the financial services industry.

The Bretton Woods Conference was thought to be so successful that some have suggested that the time is right for a 'Bretton Woods II' to establish new operating paradigms and frameworks to assure more stable and predictable international markets and financial institutions (The Guardian, 2008). This has included new thinking, such as expanding the role of the IMF, establishing a committee to conduct a more complete and detailed look at global accounting rules, and expanding the discussions around capital requirements (such as outlined in BASEL). Early discussions concerning the need for a second Bretton Woods conference have centered around replacing the US dollar as the world's reserve currency. Experts in the financial industry generally agree that Bretton Woods Conference was successful and the meeting set the broad agenda and general direction for future global economic agreements. The question is could it work again?

While the simplicity of BASEL and its easily understandable focus on capital makes sense to most of the parties affected, the subtleties of the discussion and the details outlining the conversations are often lost. While the authors of this paper examine the basics of the BASEL, understanding the context in which the BASEL Accords were written and negotiated gives considerable insight into global finance and financial services regulation as well as a look at how future financial institution regulation might be set.

BASEL GUIDELINES

Protecting banks by managing the payment system and allocating financial resources is considered critical, particularly given the central role these organizations play in the global economy (Buric, 2008). The focus of BASEL has been on managing, measuring, and controlling capital, the mechanics of which are very conventional and easy to understand. Because banks traditionally are highly leveraged with short term liabilities (deposits) and often have illiquid assets (loans), a consistent and continual review of the capital account would seem reasonable. Belief is that a strong capital base provides a cushion for a bank in order to support changes in its capital structure caused by bad credits, losses in the value of securities, or other unexpected events. As was demonstrated by the 2007-2008 economic collapse of Lehman Brothers, the subsequent crash of the U.S. housing market, and the resulting governmental bailouts needed by banks around the world, a focus on improving the capital structuring of financial institutions would seem to be prudent.

Although managing capital is a simple concept and the BASEL committee's responsibilities straight-forward, when global nuances and differences are factored in, defining and calculating capital reserves quickly becomes a challenge (Herring, 2007). Some countries employ a stringent definition that does not deviate from the traditional description of bank stockholder equity in the most rigid sense, while other financial institutions wanted a more liberal approach that includes debt instruments, a portion of loan loss reserves, and recognition of unrealized gains. The determination of bank reserves complicated further by variations in accounting guidelines. Generally Accepted Accounting Principles (GAAP) is a rules based accounting framework that is used in the world's largest economy (USA), while most global concerns use the principles-based International Financial Reporting Standards (IFRS). Although there is an international accounting body engaged in reconciling the differences between these two systems, their work is not complete and differences in still exist.

In a unique compromise the BASEL Committee determined that there would be two kinds of regulatory capital – Core capital (Tier 1) and Supplemental capital (Tier 2). Tier 1 would be the most conservative approach and include common stockholder equity, qualifying non-cumulative preferred stock, minority interest in consolidated subsidiaries - less goodwill and intangibles. Tier 2 is a broader definition including, with limitations, allowance of loan loss reserves, perpetual preferred stock, hybrid capital instruments, and subordinated debt. BASEL considers the sum of Tier 1 and 2, less certain adjustments and deductions, to be total bank capital. The BASEL Committee definition set additional standards by requiring that Tier 1 represent at least 50% of total capital and limited Tier 2 to a maximum of 100% of Tier 1 (Federal Reserve Bank of Kansas City, 2010). For example, if Bank A had 50% of its capital in Tier 1 assets (the minimum), then Tier 2 assets could equal 50% of the total. Likewise, if Bank B held 70% of its capital in Tier 1 assets, then Tier 2 assets would be limited to 30%.

In addition the BASEL Committee designed a system of calculating capital called the Risk Weighted Asset (RWA) approach. The purpose of the RWA approach was to quantify risk in the assets—especially off-balance sheet exposures—and establish the capital necessary to compensate for the risk. BASEL I suggested that the risk-weighted asset approach was the preferred methodology which banks should adopt for capital calculation because it mitigated differences due to geographical location, it does not preclude banks from carrying low-risk liquid assets on their books, and capital calculations can easily incorporate off-balance sheet risks (BASEL Committee Report, 1999). The thought was to change the basis for measuring capital from accounting values to economic values and then assess capital needs (Benston, 2007). As shown in Figure 1, cash held would be assigned a risk-weighted value of ‘0’, while loans secured by residential real estate could be assigned a weighted risk-rating of ‘.50 indicating the level of capital support required. Recognizing that both GAAP and IFRS call for reporting the fair values of assets, the RWA rule would seem to be easy to administer and the expected outcome would be a more risk-sensitive management system (Buric, 2008).

SAMPLE RISK-WEIGHTED ASSET CALCULATION

Bank Asset	Asset Amount	Risk weight	Risk-weighted asset
Cash	$5,000	.00	$0
Balances at domestic banks	5,000	.20	1,000
Loans secured by first lien on 1-to-4 family residential property	5,000	.50	2,500
Loans to private corporations	65,000	1.00	65,000
Total	**$80,000**		**$68,500**

Figure 1: Sample Risk-Weighted Asset Calculation (Fed Reserve Bank of Kansas City)

Using Tier 1 and 2 definitions of capital and risk-weightings assigned to assets, the BASEL Committee established two minimum capital ratios for banks. First, a Tier 1 ratio of 4% of risk-weighted assets was established, and second, a Tier 1+Tier 2 ratio of 8% of risk-weighted assets was established (Herring, 2007). In addition banks must maintain at least 4% of Tier 1 capital to-average total assets, which is known as the leverage ratio (Bhowmik & Tewari, 2010). The authors note that these are minimum ratios and do not take into account capital needed to support growth or mitigate unusual loan losses and adjustments.

As with defining equity, assigning risk and risk weightings has not been without controversy. The obvious challenge has been dealing with the ever-changing nature of risk. With the economic failures of 2007-2008 and subsequent business failures and government restructuring, assets thought to have minimal or no risk have deteriorated. Bonds and securities rated investment grade by major rating agencies and thought to be of limited risk failed with little or no warning. This has highlighted the challenges of defining risk and left regulatory authorities reassessing specific asset categories and looking for new tools to identify and manage risk.

THE EVOLUTION OF THE BASEL ACCORDS

As with most financial services regulatory groups the BASEL Committee has found it necessary to evolve and change the way it monitors financial institutions as global events have redefined the financial institution environment. With a primary goal of managing the systemic risk of internationally active banks and a secondary goal of leveling the playing field for all banks involved with international trade (Cornford, 2011), the program has morphed from BASEL I to BASEL II and now to BASEL III – all in recognition of the broader market changes and the need to more clearly deal with changing risk parameters. In each case the BASEL Committee has become more specific in its definitions in an attempt to clarify directions and also expanded scope as they have had more experience and feedback from implementation.

BASEL 1, which consisted of two publications (*International Convergence of Capital Measurement and Capital Standards* and *Monitoring and Strengthening the Resilience of the Banking Sector)* was published in 1988 (Blalock, 2010). These documents focused on building a framework to regulate banks involved in global activities and were focused on credit risk – the failure of borrowers to repay loans. To manage this risk the BASEL Committee established a minimum ratio of Tier 1 capital to RWA of 4% and a ratio of Tier 1 plus Tier 2 capital to RWA of 8%. (Buric, 2008). In 1996 the Committee amended its original directive and included coverage of market risk, which set minimum capital requirements for a bank's tradable security portfolio. This structural modification recognized the risk associated with changes interest rates, changes in exchange rates, and the destructive power of poorly managed derivative instruments. BASEL I was initially established for internationally active banks, but gained traction in the late 1990's and became the standard for regulation in over 100 countries (Cornford, 2011).

As the first BASEL regulation began to take effect, the Committee started to question its success. The issue at the forefront was capital arbitrage – the restructuring of credits and risk to avoid the capital requirements of BASEL I (Herring, 2007). Financial innovations such as securitization and credit derivatives, which ultimately may have increased risk in banks, were in part created and put in place to avoid the BASEL changes and improve the return on assets owned. This approach set in motion a revision (BASEL II) that was significantly more detailed and extensive than the first guidelines. While the first release of the BASEL regulations did not meet all expectations, implementation of BASEL I was an important first step in the global regulatory process, given that most nations, (including the USA) did not set capital minimums for banks until 1983 (D'Arista & Griffith-Jones, 2010).

BASEL II, is the 2004 revision of BASEL I and addresses many of the shortcomings of the first regulatory release. The focus of BASEL II was to eliminate capital arbitrage by creating more detailed risk weightings, aligning regulation with the best safety and soundness industry practices, and putting in place incentives for banks to build and maintain more sophisticated risk management systems (Herring, 2007). BASEL II is built around three pillars:

1) <u>Expanded capital requirements</u> – The new rules allow for multiple ways to assess risk in a portfolio. This includes using Value at Risk (a statistical measurement of risk at a point and time), gave banks an ability to use Credit Rating Agency risk assessments to determine capital needs (a controversial approach given this groups partial responsibility for the 2007-2008 financial crisis), and established guidelines for using internal generated risk ratings as a management tool. The intent of this pillar was to modify regulations so as to avoid the capital arbitrage that limited the effectiveness of BASEL I and in recognition of the need for a more accurate risk management system.
2) <u>Supervisory review process</u> – This section assigned responsibility for review and assurance of capital adequacy to the management team of the organization. If, in the best judgment of bank leadership, the minimum bank capital required under BASEL rules is not adequate, the supervisors must prescribe additional capital. Ultimate responsibility for managing, monitoring and maintain a safe and sound organization is the responsibility of the management team of the bank and determining capital needs to support that goal lay in an unconditional way on bank leadership.

3) Established disclosure rules – This rule establishes standards for reporting risk management activities and capital adequacy. Intent is to subject the bank to a public market review and analysis in hope of setting a high bar for performance.

BASEL II has been fraught with market skepticism and concern on several fronts. These concerns have included questions about the complexity and cost of implementing the rules, inquiries about the use of rating agencies to set risk parameters given their failures during the sub-prime crisis, and concerns about the reliance and ability of regulatory agencies to monitor the capital rules as written (Barth, Caprio & Levine, 1999); Blalock, 2010; Cornford, 2009). In addition, given local complications, several countries have begun to adopt their own modified versions of BASEL II (Buric, 2008). These 'local' modifications have the potential to usurp the intended international goals of the BASEL agreements that were intended to standardize regulatory rules across borders in a more globally focused paradigm. While there is still concern and doubt about BASEL II's long-term efficacy, most countries have agreed to implement the new regulatory scheme subject to individual timing.

BASEL III is another evolution of the accords. This iteration, along with other changes, establishes common equity and retained earnings as the primary form of Tier I capital. While past regulations set broader parameters on components of Tier 1, a minimum amount of common stock was not required. As part of this change, the proposal was made to reduce the Tier 2 capital to RWA to 7%. Implementation of some of this regulation have been postponed until 2018 and is subject to revision and comments (Blalock, 2010)

STRENGTHS AND WEAKNESSES OF BASEL

The BASEL Committee, which represents the public interest, makes three assumptions in setting its regulatory agenda. First, there are significant market imperfections – for example, FDIC insurance creates the possibility of a Moral Hazard. Second, regulations and guidelines can overcome those imperfections and third, establishing rules and regulations will in the end benefit bank operations by making them more efficient. In contrast the private interest perspective suggests that regulatory agencies cannot overcome political interest and in the end, will generate rules that are best for those in power or the politically well connected (Barth, 2006). Summarizing this, Hank Greenberg, the former Chairman of AIG Company, said it well, “A thriving financial-services sector requires a delicate balance of regulation and risk management.” (Greenberg, H, WSJ 10/02/13).

In attempting to address and deal with the balance that Mr. Greenberg describes, the BASEL committee has accomplished one major goal and should be recognized for this success. The Bank of International Settlements and its BASEL Committee, has created a platform for discussion and review of global bank regulation. The group has successfully dealt with the political and economic differences of developed and developing countries, created a measurement tool (although not perfect and debated) that has merit and is generally accepted among global banks and established a forum that recognizes the challenges that banks have working in an ever-increasing active global environment. In summary the group has created a clearing-house for regulatory review and the BASEL Committee seems to have the political will to establish and help frame the global regulatory environment; however significant challenges still exist and the measurement tools created by BASEL are constantly under review.

One of the major issues with those measurement tools has been the cost of new capital. While the concept of holding more capital is a simple and well-understood measurement, and most agree that more capital means less risk, building equity for some will change the preferred capital structure and increase the cost of capital. In competition with other investment alternatives, any bank that might deleverage itself by issuing equity will have to create preferred terms and conditions vs. other potential investments (Blaylock, 2010). Although a market for capital of banks no doubt exist, shares will have to re-price given a change in capital structure, possibly causing a loss to existing shareholders and dilution of ownership

The alternative to raising additional capital is to reduce assets, which from a pragmatic standpoint means to limit lending. This of course will improve banks’ BASEL ratios and marginalize the systemic risk associated with financial institutions—at the possible cost of economic development. The Canadian Bankers Association has warned that banks holding too much capital could have the same systemic risk of those holding too little and the Institute of International Finance suggest that implementation of BASEL

III could potentially limit GDP growth by 3% (Blaylock, 2010). Offsetting this cost, history suggests that a banking crisis is followed by a recession (Barth, Caprio, & Levine, 2006). The challenge is to balance a reduction in current lending to a systemic, unknown, future risk.

With the rise of globalization a group of banks have grown into those that are "too big to fail". This is a term used to describe banks that are so large and critical to an economy that governments will not allow them to go out of business. With this designation a bank goes from being a 'private' organization (risk taken by stockholders) to a 'public' entity (risk borne by the governments). Given the focus of BASEL is global banks and that most of them would be designated 'too big to fail' the Committee will continually operate in the gray area—a challenging place to be.

CONCLUSION AND COMMENTS

Deregulation was the watchword for banking during the 1980's (Aristand, & Griffith-Jones). In an effort to compete with what we now call the 'Shadow Banking System', banks began to move away from generating income through interest spreads to generating fees and commissions. They did this through securitizing their loans, improving and expanding trading activities, and building advisory services that were once the sole domain of investment banks – which historically carried little or no capital. This rapid and significant change had the effect of leaving many layers of the financial system self-governing and global economies vulnerable given the limited oversight

As the consequences of these changes came to light in 2007-2008 financial crisis, the interconnected nature of global economies and financial institutions were underscored. As this crisis played out in the United States with the massive failure of sub-prime securities driving an unprecedented governmental bailout program, banks and economies in the Euro-zone and other places in the world began to feel the effects. This ripple effect resulted in the shifting of discussion from 'deregulation' to 'reregulation' and gave governments around the world the political will to reestablish control. This financial crisis also highlighted the connection between developed and lesser-developed countries, which as their economies began to unravel, demanded a place at the negotiating table. It has also has reframed the discussion on financial services with some suggesting that the financial sector is a means to an end vs. a more traditional U.S. model of for profit institutions (D'Arista & Griffin-Jones, 2010).

The challenge on the table now, as economies recover and the worst of the storm seems to be behind us, has been how to regulate. What rules, governing bodies and model best works to limit the systemic risk in global markets. To date most regulators for banks have establish rules and guidelines with limited enforcement and with a soft touch not wanting to disrupt global growth - however those days seem to be over. The Bank of International Settlement and the Committee writing and negotiating BASEL agreements will no doubt play an important role in establishing operating guidelines as well as general direction for globally active financial institutions. Confidence is growing that the near future will hold significant change for banks throughout the world and that the BASEL accords will set the foundation for developing regulatory guidelines.

BASEL AND COMMUNITY BANKING

Basel III is scheduled to be implemented on January 1, 2015 and is considered one of the major regulatory challenges facing community banks (NY State Feb 2013). With this change the focus of the BASEL agreements will affect not only the "internationally active" banks that was the original focus of the committee, but also the large variety of small banks that characterize the United States financial services business (DAVIS POLK October 2013). Assigning new, more restrictive, capital standards on the smaller banks throughout the United States, as well as a capital conservation buffer, the concern is that this will be potentially harmful to the large number and diverse banking companies in the United States.

The marketplace defines community banks as those with circumscribed service areas, banks providing a unique level of community services, and those with limited asset size (usually under $1 billion) (Rose et al., 2010). These banks focus on attracting local deposit and loan business and play a major role in economic development by providing capital to the majority of small businesses (a major source of innovation and job growth) and agricultural loans which require special knowledge and insight to make and monitor (Critchfield et al., 2004). At a community bank, employees are very close to customers and often able to see the impact of decisions on the regional economy. The major challenges faced by these banks are keeping up with regulatory requirements, staying current with technology, and replacing aging management teams (Rose et al., 2010).

BASEL III represents risks to the continued growth and expansion of community banks and the many ways they support economic development in small and rural communities. The underlying rational for the BASEL accords has been “capital based supervision” (Rose, 2010). This simple concept suggests that if a firm has more of its own capital in a transaction, they will monitor and manage risk more aggressively avoiding loss and excessively risky behavior. While a reasonable assumption, the more aggressive capital based management has consequences. First it is likely because of increased capital contribution the firm will likely have a lower ROE, potentially affecting their ability to raise capital in the public marketplace. Second, the organization will have less money to lend into the market potentially affecting economic development in a specific region (Rose et. al, 2010). While the BASEL rules are generally considered sound – helping create a safe, sustainable banking sector - these rules ignore several unique strengths and competitive advantages that exist in community banks and are considered to be potentially harmful to the wide variety of commercial banks and dispersed banking market in the United States.

The community bank is trying to remain relevant and competitive in an environment where regulatory complexity is often a driver. The fixed cost of regulation is high and, in a community bank (vs. a large bank), the cost is spread over fewer customers (Hoenig, 2005).

While the end results are not assured, more regulation means increased cost, putting more pressure on community banks and the addition of BASEL III will not help promote the economic development model that community banks in the United States bring to market.

IMPLICATIONS for SMALL CPA FIRMS

A community's economic interest in the local bank is significant given the majority of small businesses (a major source of innovation and job growth) and agricultural loans are provided by community banks (Critchfield et al., 2004). Lending to what are often referred to as *informationally opaque borrowers* (borrowers without long credit histories suitable for the credit scoring of large banks) and using soft data (such as personal reputations), community banks make loans that are critical to economic development in smaller municipalities or rural towns.

The marketplace defines community banks as those with circumscribed service areas, banks providing a unique level of community services, and those with limited asset size (usually under $1 billion) (Rose et al., 2010). These banks focus on attracting local deposit and loan business and their economic future is often tied to the success of a region. They usually play a major role in small business and agricultural lending (Critchfield et al., 2004). Small commercial banks (those with less than $100 million in assets) make up 43% of banks in the U.S.; medium size banks (those with assets of $100 million to $1 billion) make up 50% of the banks in the U.S.; while large banks (those with more than $1 billion in assets) make up 7% of total banks in the U.S. Although small and medium banks make up 93% of the banks in the U.S. and the large banks make up 7%, the small banks hold 12% of the total assets and the large banks hold 88% of the total assets (Rose et al., 2010).

Based on the previous commentary concerning the BASEL accords and the potential effects on small community banks, concerns emerge considering small community banks--those banks with three or fewer offices--and the requirements for their appropriate capitalization levels. While the BASEL accords clearly targeted large multinational and international banking institutions, their effect on Community Banks is not necessarily as clearly spelled out in the language of the accords, which may affect annual Community Bank audits performed by small local CPA firms. Likewise, while the effective reach of BASEL is unclear at this time CPAs must the cognizant of their potential impact on Community Bank clients as mandated by professional and licensing standards. This article has intended to provide a basic explanation and description of the potential implications from the BASEL accords so as to provide sufficient background knowledge and information so that CPAs can exercise to professional care.

BASIL III provides restrictions that affect the banking industry, primarily in terms of the amount of capitalization required to shore up banks' ability to withstand the impact of bad loans and investments. Interestingly enough, although community banks are certainly smaller with concomitantly smaller loan portfolios, they may actually be better able to meet the new BASEL III requirements because most have above average capital ratios and often hold more capital, usually in the form of common equity (Cole, 2013). Cole further pointed out that the Basel panel noted that community banks already meet the new and enhanced standards.

Even so, auditors of small community banks should still developed appropriate auditing tests of the ratios and balances addressed by BASEL III. The new standards increase the Tier 1 common equity ratio to 4.5%, plus a capital conservation buffer of 2.5% of risk-weighted assets. In addition, the ratio of Tier 1 capital to total risk-weighted assets moves to 6% as of January 1, 2015, a standard noted as "well-capitalized" as compared to the previous 4% that the noted "adequately capitalized" (Cole, 2013; DavisPolk, 2013). The result are clear thresholds to which an auditor can compare existing community bank balances. It should be remembered that while community banks should easily meet these targets that do professional care mandates thorough consideration and appropriate testing as a component of any small community bank audit plan.

Other considerations for community banks include reducing, and equity capital by a larger proportion of mortgage servicing assets and deferred tax assets which may result in a lower capital base. This is true even though BASEL III, at least the U.S. version, retains the current capital treatment of mortgages, especially residential, and some other types of financial exposure (DavisPolk, 2013). Because of this, small and local CPA firms will have to be aware to investigate these amounts in their overall financial accounting examination.

Finally, U. S. BASEL III requires other deductions and recognitions from Tier 1 common equity balances, of which small local CPA firms must be aware when planning audits of small community banks. The deductions include reducing the common equity balance by goodwill and intangibles net of tax, deferred tax assets from operating loss and tax credit carryforwards, and defined benefit pension plan assets. All three deductions are net of deferred tax liabilities. The recognitions include deferred tax assets related two certain operating loss carry backs, mortgage servicing assets, and significant investments in unconsolidated financial institutions in the form of common stock (DavisPolk, 2013, 8-9).

Clearly, small local CPA firms which have small community banks as audit clients must make sure their audit staff are properly trained and properly educated concerning the requirements of BASEL III, especially the U.S. version which directly impacts small community banks. From the literature it appears that these small community banks will actually be in pretty good shape compared to large financial institutions, primarily due to the higher capitalization ratios most of them carry as a course of normal business operations. Small local CPA firms should have no problem modifying existing or previous audit plans to include appropriate substantive testing to ensure that the client is following current laws and regulations related two BASEL III.

CONCLUSIONS

The financial meltdown that began in 2008 has caused global upheaval in financial institutions from large megabanks all the way down to small community banks. The Basel accords seek to provide guidance concerning the financial health of the banking industry, primarily in the area of capitalization and the percentage of assets held in reserve. As a result, CPA firms that are hired to provide audit services must become well-educated about the often highly quantitative rules and regulations that impact their clients. While this is often matter-of-fact for national and regional CPA firms, and there large staffs of professional employees, small local CPA firms with perhaps one or two professionals may find it difficult to obtain the guidance necessary to properly design U. S. BASEL III compliant audit programs.

This article has sought to provide a basic beginning level introduction to the requirements that the BASEL III accords will impose upon small community banks which are often audited by small local CPA firms. This article was not intended to be a definitive guide or a complete explanation; rather a starting point from which professional staff at small local CPA firms can continue a more detailed and thorough examination of the new regulations, and their implications for community bank audits.

the authors wish to encourage readers whose clientele may include small community banks to consult some of the references provided herein as a means of furthering and deepening those readers' understanding of the new financial landscape. While this has been a rather slow process which is been in play for over a decade, the bottom line is that banks at all levels of the banking industry will be touched by the emerging and continuously updating Basel accords, professional auditors from large multinational partnerships to rural individual CPAs must become competent so as to provide do professional care and diligent auditing services.

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A Case Study in Medicare Fraud

Suitable for University courses related to ethics, internal controls, fraud, auditing

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Abstract

In October of 1996, a home health care organization and its purchaser agreed to reimburse the federal government $255 million for overbilling and making fraudulent Medicare claims. Under the agreement, First American Health Care of Georgia, Inc., the nation's largest home health care provider, and its new owner, Integrated Health Services, Inc, agreed to reimburse the federal government for money stolen from Medicare through fraudulent billing practices. The alleged fraud was that First American billed Medicare for costs unrelated to the care of patients in their homes, including the personal expenses of First American's senior management, as well as for the company's marketing and lobbying expenses. In a related criminal action, the company's two major principals, Jack and Margie Mills, were found guilty of defrauding Medicare, and were sentenced to prison terms of 90 months and 32 months, respectively, for their participation in the fraud. This case is applicable to a university course related to fraud, ethics, auditing, internal controls, etc.

ABC HOME HEALTH: WALKING THE THIN GRAY LINE

Introduction

In October of 1996, a home health care organization and its purchaser agreed to reimburse the federal government $255 million for overbilling and making fraudulent Medicare claims. Under the agreement, First American Health Care of Georgia, Inc., the nation's largest home health care provider, and its new owner, Integrated Health Services, Inc, agreed to reimburse the federal government for money stolen from Medicare through fraudulent billing practices. The alleged fraud was that First American billed Medicare for costs unrelated to the care of patients in their homes, including the personal expenses of First American's senior management, as well as for the company's marketing and lobbying expenses. In a related criminal action, the company's two major principals, Jack and Margie Mills, were found guilty of defrauding Medicare, and were sentenced to prison terms of 90 months and 32 months, respectively, for their participation in the fraud.

Background Medicare Reimbursement and the Home Health Care System

Medicare Overview

Medicare is a social insurance program administered by the United States government, providing health insurance coverage to people who are aged 65 and over, or who meet other special criteria. The program also funds residency training programs for the vast majority of physicians in the United States. Medicare operates as a single-payer health care system.

Whenever a nurse visits an elderly patient's home to change a dressing, administer insulin or provide other services, Medicare reimburses a home-care company for all its costs. Those costs include not just medical supplies and nurses' wages but also indirect expenses such as executive salaries, office rent and brochures.

Home Health Care System

The Medicare home-health care system has three players. First, care providers such as ABC HH/First American care for patients in exchange for reimbursement of their reasonable patient care-related expenses. The second player, the fiscal intermediary, holds the purse strings to reimbursement funds under contract with the third player, the Health Care Financing Administration (HCFA), a government agency. Fiscal intermediaries, like providers, are entitled only to a return of their costs in exchange for their services. Aetna Life Insurance Company was First American's intermediary during most of the time period relevant here.

Providers commonly receive biweekly payments in an amount based on quarterly figures of how many patients the provider has visited and how much each visit costs. At year end, providers submit an annual "cost report" for a true-up with the sum of these interim payments. If the total interim payments exceed the provider's actual allowable expenses as determined by the cost report, the provider owes the intermediary money. If, on the other hand, the provider's actual allowable expenses surpass the total periodic payments, the intermediary pays the provider. In practice, Aetna subjected First American's cost reports to a detailed audit, and this true-up for years as far back as 1990 was incomplete at the time of trial.

It is important to also note that the 45,000-page Medicare rule book contains decades of clarifications and interpretations piled on top of one another. Experts often could not agree on what is not allowable and what was barely allowable. Thus, creating a thin gray line for home health providers to use as a guide.

The Mills and the Origin of ABC Home Health

Jack Mills, born in Demopolis AL in 1938, pumped gasoline at his father's filling station. His first job after high school was cutting tree branches for a power company. Jack went to work for Pitney Bowes in Florida, in 1968 as a copier salesman, earning about $106K annually.

Margie Mills, was a nurse at a tiny Jacksonville, Florida agency, ABC HH, whose owner wanted to sell. Jack and Margie, together, scraped up $15K and took over the Florida agency, with 8 employees and 30 patients. The company was moved to Brunswick, Georgia in 1978. ABC Home Health grew from a single agency employing six people to nearly 350 agencies in 19 states employing more the 7,600 in 1993.

ABC was instrumental in the rapid development of patient care in their own home rather than a hospital setting. In the mid-1980s chemotherapy and AIDS patients required more services and were going home from the hospital with many more needs. Medical equipment was becoming portable and could be used in the home. The home health industry and the durable medical equipment industry were both seeing expansion in the industry. Services provided by ABC included licensed practical nursing, psychiatric nursing visits, physical therapy, occupational therapy, speech therapy. No doubt, ABC was influential in the shift of hospital care to home health care.

Company Growth

The company's growth continued with the following notable milestones
1978 – First American has nearly 500 agencies in 22 states. (Tampa Bay Times 2005)
1990 – 141 local offices in 10 states and 21,431 patients 1.3 million visits, Medicare revenues of $83.5M
1993 - 350 agencies in 19 states employing more the 7,600.
1994 – 354 offices in 21 states and 58,330 patients 7.8 million visits Medicare revenues of $615.9M.

Accolades

ABC Home Health's primary concern of employees is to help those in need, whether they are a patient, a coworker, a neighbor, fried, or complete stranger. Nurses were known for their compassionate giving to their patients and their families, above and beyond the call of duty.

Cookbook- Habitat for humanity

Margie orchestrated the publication of cookbook, ABC Home Health Cookbook. Proceeds from the sale of cookbook were dedicated to a special project of habitat for Humanity in Glynn County, Georgia. ABC Home Health Services was the first corporate sponsor of a Habitat for Humanity construction project in Glynn County. The project sought to raise $25,000 to build a new home for an ABC employee and her six-year-old daughter. The single mother was determined to get her education and get off welfare.

Community
Jack and Margie were involved in numerous community-help organizations including the American Red Cross, United Way, Kiwanis Club, American Cancer Society. They were also active members in their local church.

The Slippery Slope
In the mid-1980s, disputes arose between Blue Cross and Blue Shield of Georgia, then First American's intermediary, over Jack's use of airplanes to get around; Jack took the position that his family life warranted the substantial additional expense to Medicare.

In 1989, Aetna threatened to withhold interim payments because First American had denied access to records. In 1990, Aetna reported First American to the Office of the Inspector General because of perceived irregularities and withheld interim payments because of a sudden and unexplained increase in costs.

In 1992 Lloyd Brubaker contacted federal officials to discuss shady practices at his previous employer of deceiving Medicare about who used corporate aircraft and where the planes went.

ABC collected $615.9-million from Medicare in 1994 – up from $83.5-million for years earlier (GAO, Tampa Bay Times 10/4/2005).

1995 – OIG sought to exclude ABC from participation in the Medicare program of seven years charging that ABC had submitted false or fraudulent charges to the Medicare program for patient-related services allegedly made over the course of three fiscal years.

First American filed Chapter 11 Bankruptcy February 21, 1996. It was confirmed October 4, 1996.

The merger of First American with Integrated Health Services (IHS) closed October 16, 1996, at $329M, effective November 15, 1996. Effective with this merger, First American emerged from Chapter 11.

February 1999 Medshares purchased 69 home healthcare agencies from IHS (IHS sold its home health division due to changes in Medicare reimbursement system).

Allegations of Fraud
Reports by the HHS Inspector General and the General Accounting Office portray a firm that grew rapidly while billing the federal government for marketing services, lobbying and the purchase of new agencies.

In 1987, for instance, ABC submitted bills for $3,832 in maid service on the condominium owned by ABC executives Jack and Margie Mills and $5,132 for the lease on their son's BMW and for his college costs.

ABC's 1992 Medicare bills included $1.7-million in salaries, benefits and travel that the Inspector General found "unallowable." The auditors counted 17 "Associate Directors of Community Affairs" whose activities included soliciting patients for the home health care agencies.

THE BILLS INCLUDED:
- $1.02-million Leadership conference in San Diego
- $366,465 - Salary for ABC Chairman Robert "Jack" Mills
- $304,885 - Salary for ABC President Margie Mills
- $2,723 - 6,000 ABC golf tees
- $21,243 - 3,000 ABC earrings and 99 cufflinks
- $30,888 - 88,272 containers of ABC hand and body lotion
- $14,415 - 334,590 ABC emery boards
- $38,969 - 142,835 ABC refrigerator magnets
- $37,568 - 131,023 ABC promotional pens
- $84,341 - 5,100 custom tins of gourmet popcorn for physicians
- $14,861 - Dinnerware
- $2,700 - 22 Mardis Gras Tickets
- $686 - 98 bags of Vidalia onions for legislators
- $2,473 - Luncheons with legislators

Source: Inspector General, Department of Health and Human Services.

The Company also billed Medicare for tickets to the Phantom of the Opera and for presents to state legislators, including 98 bags of Vidalia onions for $686. Medicare also paid $72,500 for board of directors fees on a board made up of five members of the co-owners' immediate family.

Schemes

Personal Use of Medicare-Reimbursed Airplanes

First American owned, leased, or borrowed several airplanes, including a $2.8 million King Air jet, that its executives used for business travel. Aetna policies did not prohibit reimbursement of the corporate airplane costs. Aetna agreed to reimburse First American for its plane installment payments, provided that at least 90% of the plane's flight time was reimbursable, patient care-related travel. Aetna also consented to reimburse expenses such as maintenance and pilot salaries prorated to the percentage of time spent on business travel.

During and after these discussions with Aetna, Jack and Margie took First American planes on dozens of personal trips-twelve round trips alleged in the indictment, 72 total found by investigators, including attending their high school reunions and sports events like Auburn University football games.

The costs allocable to this personal use would not have been reimbursable, of course, under the arrangement with Aetna. If this use rose over 10% of total flying time, moreover, it threatened reimbursement for the King Air payments. First American, at Jack's direction and with the cooperation of the chief pilot, Jim McManus, therefore undertook to disguise and conceal personal use.

Chief ABC pilot, James McManus, testified in court that on occasion the company's pilots disconnected monitoring equipment on certain trips in which Jack and Margie attended Auburn games, a Mexican resort, and other personal destinations of the Millses

1. Kickbacks on Aviation Fuel Purchases

First American purchased most of its fuel and leased hangar and office space from Golden Isles Aviation, Inc., on St. Simons Island. For some time, Golden Isles had discounted the fuel sold to First American because of the volume purchased. The difference between retail and First American's price would go into a rebate account with Golden Isles. Golden Isles applied the rebate account to renovation costs for First American's hangar and other maintenance expenses. Invoices would be presented to Golden Isles to be paid out of the rebate account, or charges billed on a credit card paid by Golden Isles out of the rebate account. Checks from this account also reimbursed Jack for fuel he bought for some personal flights; thus, although it would appear that Medicare was not fueling the flights, through the rebate mechanism it was.

First American reported the full fuel cost as part of its travel expenses. Thus, First American had the advantage of using the rebate money without having to justify the relation between the expenditures and patient care (Findlaw, 1998).

2. Lobbying Expenses

Medicare reimburses providers only their actual costs for patient care. Thus, Medicare providers cannot make a profit. A legislative proposal called the "prospective payment system," or "PPS," however, would change this system. Under "PPS," providers would receive a flat fee for patient care. Hence, an efficient provider-or one that successfully inflated the baseline costs on which the flat fee rested-could realize a profit. As Jack explained in a speech to First American employees, with PPS First American could go public and make lots of money. For this reason, Jack hired lobbyists to promote PPS. Some were politicians, whom First American hired as a "consultant" to introduce Jack to influential lawmakers. Others were full-time, professional lobbyists. Lobbying costs are not reimbursable. First American's lobbying expenses were therefore reported on First American's cost reports as consulting expenses, which are reimbursable. These misrepresentations were backed up by well-engineered paperwork (Findlaw, 1998).

3. Political Contributions

In June 1991, during a Georgia gubernatorial campaign, Jack pressured seven First American executives to attend a Zell Miller fundraiser. All seven executives made $500 contributions, which were then reimbursed by way of "bonuses" that were reported to Aetna as reimbursable salary expense. Jack testified that the contributions were purely coincidental to the bonuses, but there was no evidence that any executive who had not made a contribution received a $500 bonus at this time. Jack's demand of an Alabama manager to make campaign contributions, again to be reimbursed by padding expense reports, failed because First American's accounting department refused to approve the expense reports.

Various employees testified that Mills urged them to donate funds to political candidates while giving the employee equal-sized bonuses (Findlaw, 1998).

4. "Salaries" to Former Owners of Acquired Agencies

GAO also described the ways ABC skirted Medicare rules in purchasing new home health care agencies. The company offered the owners a low purchase price in conjunction with a sizable employment contract. The employment contract would be reimbursable under Medicare.

First American was growing rapidly during the late eighties and early nineties. The company achieved this rapid expansion by acquiring local home health care providers, often those that were in financial difficulty. First American's cash-flow predicament, however, made it difficult for it to pay for even these ailing agencies. Medicare would not pay for First American's acquisition of other agencies' goodwill (Findlaw, 1998).

Jack solved this problem in a few cases by inducing the owners of acquired agencies to sell by putting them on First American's payroll to be "community relations" specialists or, as one was told, "vice president of smiles." (R. 36 at 98-99.) A common thread was that the jobs were sinecures that required a few hours of marketing work a week with no patient care-related responsibilities. In all these instances, First American was careful to maintain an appearance of employment. Timesheets, often signed in blank by the owners, were also kept.

First American avoided paying out of pocket more than a few thousand dollars for any agency, enough to cover the tangible assets such as furniture. Many of the owners had substantial liabilities, however, that they had guaranteed personally. Jack's solution to this problem was to encourage the agencies to delay reporting the purchase to the fiscal intermediary and to continue receiving periodic interim payments, which the owners would use as they pleased. Although the agency would owe those payments back to the government, the agency's sale of its assets to First American would prevent the government from ever collecting the money. Meanwhile, the liabilities would be paid, and the owner would walk away with a handsome employment contract.

TRIAL FACTS

An August 1995 indictment charged that the company conspired to cheat Medicare out of more than $1 million in reimbursements from about 1990 to 1994. It is important to note that the fraud indictment in 1995 singled out a few spending practices and did not reflect on patient care in any way.

On April 10, 1998, a grand jury indicted Jack and Margie with First American, a First American accountant, and James McManus. The 82-count indictment included, against various defendants, one count of conspiracy in violation of 18 U.S.C. § 371; multiple counts of mail fraud in violation of 18 U.S.C.§ 1341; receipt of Medicare kickbacks in violation of 42 U.S.C. § 1320; falsification of documents submitted to the government, in violation of 18 U.S.C. § 1001; money laundering in violation of 18 U.S.C. § 1957; Filing false tax returns in violation of 26 U.S.C. § 7206; and one count of witness tampering in violation of 18 U.S.C. § 1512. McManus pleaded guilty to the conspiracy charge and testified against the other defendants *Medicare & Medicaid, 1998)*.

At the time of Jack's trial ABC HH was the largest privately held home health provider in the US. Revenues consisted of 95% of Medicare reimbursement. First American was convicted on all counts against it.

Jack was convicted of all counts except those for tax evasion. Jack served a 7 ½ year sentence in minimum security federal prison in Jesup, GA, for more than 2 dozen counts of fraud and a $10.2M fine. Margie was convicted of two acts of falsification. (1) In 1993 return trip from Europe concealed from customs inspectors a purchase of jewelry subject to duty and (2) Margie filled out and signed two Aetna mandated passenger manifests to report that she traveled in August 1992 from SSI to San Antonio and back in connection with First American's acquisition of a home health care provider in Texas. In fact, Margie went to Mobile, where the plane stopped enroute to attend her high school reunion. Margie Mills was sentenced to 32 months in prison.

Arthur C. DeLozier, the company's chief accountant, was found innocent on all 36 charges against him.

Epilogue:
IHS never paid the Federal Government under the terms of the settlement, and IHS itself filed for bankruptcy in February of 2000. The bankruptcy courts later collected 7.5 cents on the dollar, or $19.1 million of the original $255 million settlement.

Even after his conviction and being forced to sell ABC HH, Mills remained unrepentant, certain he was railroaded by federal prosecutors. He was quoted as saying he had "no remorse" over any of his actions related to ABC, which is consistent with what he said during his trial: "The [Medicare] manual tells you what you can't do. So if it's silent you can do it" (Mills, 1997).

QUESTIONS FOR STUDENTS:
(Will ask for feedback during conference presentations)
Fraud Triangle

The fraud triangle identifies conditions or circumstances that are often precursors to financial fraud. Define the three categories of fraud risk factors that are included in the fraud triangle and provide specific examples of each. (IMA)

What rational and legitimate explanations could be given…?

Internal Controls
A system of internal controls should be designed to protect assets and ensure compliance with organizational policies and procedures. Do you believe that ABC Home Health had a reasonable system of internal controls? Explain why or why not. (IMA)

Corporate Governance
Organizational governance reflects the manner in which management is directed, administered, and controlled toward the achievement of mission and vision. Was the appropriate level of governance being provided by the executive management at ABC Home Health? What legal and ethical issues arose related to the various stakeholders given the lack of good organizational governance?

COSO
The Committee of Sponsoring Organizations of the Treadway Commission (COSO) internal control framework identifies the five principal components that should be present in an organization's system of internal control. Name and briefly describe each of those components. (IMA)

Stakeholders
What stakeholders were negatively affected by ABC Home Health's lack of internal controls and its leaders' criminal behavior? How so? (IMA)

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A Comparison Study to Analyze the Data Acquisitions of iOS and Android Smartphones Using Multiple Forensic Tools

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Abstract

Nowadays, most people carry their smartphone with them wherever they go, and it has become one of the primary necessities to not leave your home without. Because of the ever-growing rise in smartphone usage, we store a majority of our personal information into these handheld devices as they have evolved into an extension of ourselves. Additionally, it is critical to acknowledge how multiple mobile applications are connected to cloud storage. The purpose of this study is to emphasize the significance of data remanence pertaining to mobile devices and how forensic data acquisitions from mobile phones prove as high value evidence in legal cases. We conducted an experimental methodology using various data acquisition tools, such as Magnet AXIOM, Oxygen Forensic Detective, and Belkasoft X to extract data from previously used smartphone devices purchased from an eCommerce website. The study provides a comparison analysis between the data acquisition tools and the following smartphones: Apple iPhone 8, Samsung S9+, and Google Pixel 3, to determine which tools are more effective at extracting a specific range of deleted datasets.

A Comprehensive Review: Themes of Motivational Theory

Sydney Wagner, Dr. Johanna Sweet

Purpose Statement

The field of motivational theory has evolved over the past century, shifting from biological perspectives to psychological and sociological perspectives. In order to understand the full scope of motivational theory, prominent literature has been reviewed for the purpose of drawing out common key themes.

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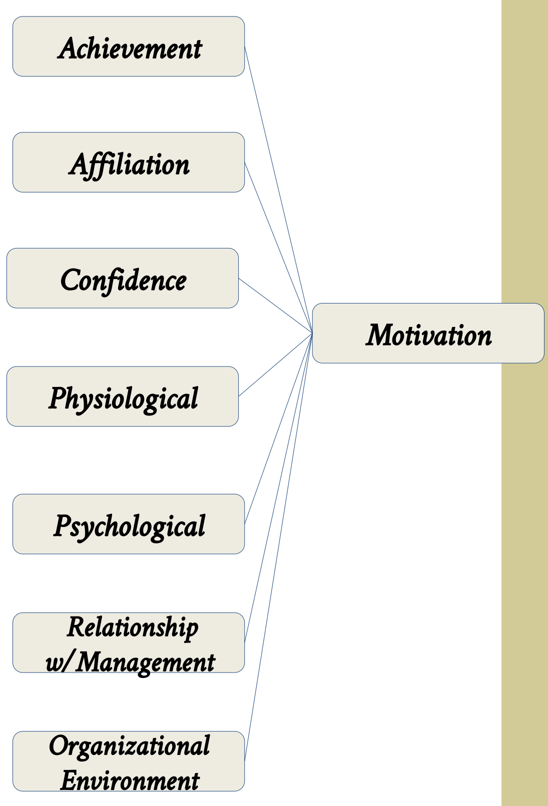
Literature Review

Maslow (1943): A hierarchy of needs that prioritizes physiological, safety, belongingness, self-esteem, and self-actualization.
Herzberg (1959): Motivator theory emphasizes reward, environment, and bonds with co-workers as an important part of satisfaction. Hygiene factors, however, can lead to dissatisfaction.
Adams (1963) and (1965): Equity theory (1963) posits that the inputs and outputs of work must be proportional and equitable with others.. Justice theory (1965) establishes that interactional, distributive, and procedural justice are important to motivational theory.
Vroom (1964): Expectancy theory is based on valence, expectancy, and instrumentality.
McClelland (1965): McClelland established the need for achievement, the need for affiliation, and the need for power.
McGregor (1965): X and Y theory of motivation emphasize autonomy in the workplace.
Alderfer (1969): ERG theory explains that human beings are motivated by the need for existence, belongingness, and growth.
Bandura (1977): Self-efficacy is influenced by physiology, behavior modeling, prior experience, and persuasion.
Deci & Ryan (2000): Self-determination theory (SDT) emphasizes autonomy, competence, and relatedness as keys to motivation.
Luthans (2004): Psychological capital (PsyCap) states that hope, self-efficacy, optimism, and resilience improve productivity.

Themes



A PANEL DISCUSSION ON STUDENT PERSISTENCE DURING THE 2020 COVID-PANDEMIC

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Jennifer Calhoun, Coastal Carolina University, jcalhoun@coastal.edu
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Michael Latta: Impact of Student Persistence on Grades During the 2020 Covid-19 Pandemic
Persistence is often studied as an outcome instead of a predictor, probably because of its believed connection to student retention. Student persistence in college can be measured in a course by using the Short Grit Scale (Grit-S) which measures trait level persistence in a two-factor approach. These two factors are defined below:

Consistency of Interest.	Perseverance of Effort.
New ideas and projects sometimes distract me from previous ones. I often set a goal but later choose to pursue a different one. I have difficulty maintaining my focus on projects that take more than a few months to complete. My interests change from year to year. I have been obsessed with a certain idea or project for a short time but later lost interest.	Setbacks don't discourage me. I don't give up easily. I am a hard worker. I finish whatever I begin. I am diligent. I never give up. I have overcome setbacks to conquer an important challenge. Duckworth, A. L. & Quinn, P. D. (2009). Development and Validation of the Short Grit Scale (Grit-S). *Journal of Personality Assessment,* 91(2), 166-174.

Data for persistence and grade came from 48 male and 41 female students in the 2020 WinterMester and Fall Semester classes Decision Analysis, Advertising, and Marketing Strategy. Stepwise Regression using the Grit Scale items and gender to predict Grade showed 'I am a hard worker.'($p < .001$) and Gender $p < (.05)$ as significant predictors of Student Persistence.

Jennifer Calhoun: Persistence from the Point of View of Senior Business Students in a Distance Learning Class
The flexibility of online learning provides an opportunity for adult learners to attend classes given their busy schedules. Students who were persistent were inclined to be more self-motivated, hopeful of the future, and responded more readily to a positive online learning environment.

Bomi Kang: Implicit Theories of Intelligence and Persistence
This study examined the relationship between students' adoption of technology and its antecedents and consequences. Applying Implicit Theories of Intelligence (ITI), the authors examined Incremental and Entity support as determinants of achievement and intention to stay in a course. Implicit Theories of Intelligence Scales for Academic Achievement was modified and operationalized to measure students' attitudes and adoptability. Data were collected from business majors located in the south east of the

United States. Using structural equation modeling, the researchers examined path relationship of intelligence, technology adoption, anxiety, self-efficacy, intention to stay, and academic achievement. This presentation reports the results of principal components analysis, and alternative structural equation models and the implication for teachers, administrators, program coordinators, and students.

Mark Mitchell: COVID Pandemic and Student Persistence a Personal Statement from a Parent/Faculty Member

Time and time again, we educators talk about the need for organizations to adapt and adjust to changing market conditions. The COVID-19 global pandemic required all of us, as individuals, to follow this advice. I am the parent of 3 college students. At home, we talked about my children's professional goals and their planned timeline for reaching them. Stay on task, stay on target. Don't get distracted. Position yourself for success in this new reality. I just tried to bring the same discussion to my own students at my university. I spent more time on encouragement, updates, and outreach to make sure my students were doing well both in the classroom and as young people living through a strange time for us all. Like all parents, I want my children to succeed. I also want my students to succeed. I hope that commitment shined through as we navigate(d) COVID Land. It really is a privilege to be in a position to help young people reach their goals and position themselves the next phase of their lives. I love my job.

Heather Carle: Helping MBA Students Persist During the COVID Pandemic

We know from the research that a student's own level of self-efficacy contributes to emotional engagement and student achievement over time. As faculty members helping students navigate this disruptive time of COVID, decisions on lecture and assignment design for the online format to reduce social isolation was important, as was the design of course pacing and the selection of technology to be used to facilitate active learning, communication and collaboration. The risk however is that a lack of familiarity with these tools and online formats creates an even greater additional time and cognitive burden that may place a drag on time available to complete assignments and therefore performance, despite the best efforts of the faculty member.

ADOLESCENT SEXUAL VICTIMIZATION: THE ECONOMICS OF CALCULATING EARNINGS CAPACITY LOSSES

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ABSTRACT

Forensic economists are often asked to calculate the loss of future earnings capacity of adolescents and children. This is an important issue in a variety of legal situations, such as the death or injury to an adolescent, or in various cases where children, adolescents and teenagers have been victimized. Since victims in these age groups have not established careers or long-term income records, forecasting the long-term impact on earnings is particularly difficult. This paper examines one possible approach for examining this issue, the use of the Work Ability Index (WAI) and Work Ability Scale (WAS). In this pilot study, empirical data is analyzed to determine the relationship between scores on the WAI/WAS and future income loss. We then examine how this could be applied to adolescent victimization cases.

INTRODUCTION

Unfortunately, sexual assaults on adolescents and children in the U.S. appears almost endemic in its frequency. The *National Center for Victims of Crime* reports that nearly one in five girls in the U.S. are victims of some form of sexual assault, while one in twenty boys are victims [28]. Over the course of their lifetime, it is estimated that almost 30% of U.S. adolescents between the ages of 14 to 17 have been sexually victimized in some manner. Statistics consistently show that the vast majority of sexually victimized adolescents knew the perpetrator, who generally held a traditional position of authority and trust, such as a schoolteacher, counselor, relative, clergy, or coach.

It is well established that victims of sexual assault, both males and females, suffer from a variety of psychological and physical effects, including PTSD, suicide, self-harm, and depression [7] [9]. Victims, on the average, have more difficulties in school, problems developing positive relationships with peers and friends, and difficulties in family and work relationships. Victims of adolescent sextual assault are also 6 times more likely than the general population to use cocaine in later life, and 10 times more likely to use other illegal "hard" drugs [8] [20] [28].

Not surprising, as more awareness about adolescent sexual victimization has developed, there has been a flood of civil lawsuits against not only the individual perpetrators of the adolescent sexual assault, but also against the institutions that have not actively and properly monitored, policed, or addressed this problem within their organizations.

In cases of adolescent sexual assault, forensic economists are often called upon to determine the economic loss associated with the crime. However, unlike other types of personal injury cases involving adults, where the victim might be working in an established job, with an identifiable record of wages, and the injury created either a temporary or permanent reduction/elimination of this income stream, adolescents in middle school and high school have not yet established a career path or an identifiable long-term income stream. This creates an additional problem for the forensic economist.

We do know, however, that there are significant long-term links between adolescent maltreatment/victimization, including sexual assaults, and later socio-economic attainment. Sexual assault victims are clearly at increased risk for financial and employment-related difficulties in adulthood. Merritt (2021), for example, points out,

> *Scientific studies have shown that individuals first exposed to criminal victimization as children or in adolescence have significantly lower life-course income as compared to those not exposed to such victimization until later in life, probably because their educational and occupational attainment is reduced. Plaintiffs who have suffered sexual abuse, especially where the incident of abuse occurred at a young age, will likely experience diminished ability to work steadily. Their working life will likely be disrupted by persistent psychological difficulties caused or exacerbated by the abuse, such as post-traumatic stress disorder (PTSD), trust issues, anxiety, panic attacks, social isolation, relationship difficulties and educational difficulties* [26].

Not only is the social-economic impact felt at the individual level, but the psychological, emotional and physical issues associated with sexual assault also have broader societal level impacts due to the need for increased public assistance programs, managing increased criminal behaviors, and the overall diminished productivity levels of victims as they progress through adulthood.

Oftentimes in adolescent sexual assault cases, the forensic economist takes a generalized approach. As previously mentioned, it is well established that child mistreatment and adverse childhood experiences, including sexual abuse, significantly impact~~s~~ the future life opportunities and adult earnings of that child [3] [27]. MacMillan [23] using the large country-wide data base of assault victimization (Canadian General Social Survey) estimated an annual average loss due to adolescent (<18 years old) sexual abuse. This data indicated an average loss associated with decreased earnings capacity for males due to sexual assault of $9,788 (converted to 2021 U.S. dollars) per year, for the victim's work-life. Merritt [26] calls this method the "modified earnings capacity approach" where an average economic loss is calculated from a database, and then based upon the average income loss associated with the loss of earnings capacity, this is then applied to the work-life expectancy of the victim. Zielinski's [40] research using a large database (National Comorbidity Study) indicated that sexually abused children were "80% more likely than non-victims to fall below the federal poverty level", and "90% more likely to have family earnings in the lowest income quartile" [38, 672]. Based upon the data presented in Zielinski, we calculated an average $14,204 (2021 U.S. dollars) per year loss associated with the decreased earnings capacity of sexually assaulted adolescents during their work-life.

The advantage of the modified earnings capacity approach is that it is based upon a large sample of data collected in National surveys. The disadvantage, however, is that the modified earnings capacity approach is based simply on averages. It does not address either the victims individual psychological or emotional state, nor does it address the likely career path of the individual sexual assault victim based upon their family background and aspirations. To go beyond the generalized, "modified earnings capacity approach", the forensic economist is confronted with two fundamental issues, a forecast of the adolescent's future earnings capacity "but-for" the victimization and the impact of the assault on this future earnings capacity. We look at each of these issues in more detail.

In particular, this paper examines one possible approach for examining this issue, the use of the Work Ability Index (WAI) and Work Ability Scale (WAS). In this pilot study, empirical data from a sample of individuals with injuries/conditions is analyzed to determine the relationship between scores on the WAI/WAS and actual future income loss. We then examine how this could be applied to adolescent sexual victimization cases. In these examples, we assume that forensic economists are looking primarily at the issue of lost future earnings capacity of the individual victim. While recognizing there are certainly broader categories of potential damages, such as hedonic, pain and suffering, and punitive, associated with adolescent sexual assault, the forensic economist generally only examines the issue of lost wages/paid benefits and future earnings capacity.

CALCULATING ADOLESCENT FUTURE EARNINGS CAPACITY

Since adolescent victims have not yet established a career path, with an identifiable income, it becomes necessary to estimate the future earnings capacity of the adolescent prior to applying any "impact" calculation. The link between teenage career aspirations and adult career attainment has been well established in the literature [1] [6] [25] [33] [39]. In general, research has found that trajectories into adulthood are influenced by a combination of the demographic/socio-economic characteristics of the individuals/families and the ambitions of the adolescents. For example, in their study of teenagers, Csikszentmihalyi & Schneider [6] found that gender, race, and ethnicity make little difference in predicting future adult activity, while social class of family is strongly related to future career path and postsecondary education. Also, research has found that regardless of gender, race, ethnicity, or social class, adolescents expect to work, marry, have children, and retire at a normal retirement age [6]. However, for adolescents/teenagers, the notion of aspirations (in addition to family background) plays an increasingly important factor in predicting later adult achievement. Ashby and Schoon [1] for example, found "family background factors (social status/family income), and teenage career aspirations and ambition value interact to influence social status attainment and earnings in adulthood" [1, p. 350].

Rather than simply developing a predictive, linear model of future career attainment and income, the current career attainment empirical literature recognizes that there are different classes of social-economic behaviors by adolescents and young-adults, and the primary focus of this empirical research is to understand the nature of adolescent transitions into these different paths toward young adulthood. Not surprisingly, common methodologies used in this research literature tends to be a combination of cluster analysis and structural equation modeling designed to identify typologies of behaviors, the interactions of various predictors, and the possible trajectories into adulthood. While career transitions and trajectories between different socio-economic attainment classifications and behavioral types is insightful, it is difficult to map this research directly into a predictive model of future earnings capacity. However, the primary outcome of the career attainment literature for the forensic economist is the recognition that three important characteristics significantly influence/predict future career paths for adolescents and teenagers – *family background factors*, *adolescent career aspirations/ambitions*, and *grades in school*.

Within the forensic economics literature, there has been significant research related to part of the picture, that is forecasting future adult socio-economic attainment based upon the family background factors of children. For example, some forensic economists have used various statistics derived from General Social Survey (GSS) [14]. The GSS database, maintained by the National Opinion Research Center (NORC) at the University of Chicago, has been active since 1972 and offers a variety of variables that tie into the idea of calculating adult income trajectories from a more socio-economic perspective. For example, one variable in the GSS asks about family income at age 16. However, the GSS does not ask specifically about family income, but rather whether family was far below average, below average, average, above average, or far above average. Another question asks whether the respondent was living with parents at age 16, while another question asks if the family owned or rented at age 16. In addition, the GSS also records other family background variables, such as the father's and mother's educational level by grade completed, and father's occupation. These variables can then be used to correlate with current family income, employment or educational attainment. For example, we estimated a simple regression of current family income using as predictor variables, family income at age 16, father and mother's educational attainment, and whether living with parents at age 16 using the most recent, 2014 to 2018 GSS survey data. The results are show in Table 1.

Table 1: Regression: Current Family Income

Variable	Coefficient
Constant	11.418***
Father's Highest Education	0.0266***
Mother's Highest Education	0.0041
Family Income at age 16	1.2641***
Living with Parents at age 16	-0.1208

****prob<0.01*, t-statistic

From this simple analysis, the importance of "family background" appears apparent. However, since most variables of interest in the GSS are classification variables (including current family income, current personal income, and current education) it could be possible to perform a Probit regression and then calculate probability distributions given the dependent variables of interest. Another option would be to use other types of classification techniques, such as neural networks or a Bayesian Data Reduction Algorithm (BDRA), which don't have the same probability distribution assumptions as various regression techniques [21]. It should also be pointed out that while the GSS has been collected since 1972, not all questions are asked each year.

Likewise, several researchers have used the *National Longitudinal Studies of Youth* (NLS) data to estimate future educational attainment [13] [17] [18] [35]. In general, these studies have also identified certain predictor variables in the database, such as educational attainment of father/mother, ethnicity, etc., and ~~the~~ using a standard Probit regression developed a probabilistic model of adult educational attainment. For example, Kane et al [18] used an ordered Probit regression, estimating two different models (one with a family income variable and one without) for both males and females. The forensic economist can then use the estimated probability curve to determine a likely future income using the probabilities associated with different classes of educational attainment, and their associated income levels.

However, while both the GSS and NLS are very useful for predicting future income for younger children (when aspirations are not clear) there is little in this research stream addressing the teenagers' *ambitions and aspirations*, a critical predictor component for adolescent and teenage future socio-economic attainment. As Mann et al. [24] note in their review of indicators of successful transitions to adult work, "higher teenage occupational aspirations are associated with better adult economic outcomes".

An additional compounding factor is that lawsuits are often filed years after the sexual assaults actually occurred, when the victim has already reached adulthood. This requires the victim to think back and recall the important predictive characteristics. As a case example, suppose the victim is now 21 years old, but the sexual assaults occurred in early high school -- the forensic economist could interview or provide a survey to the victim, with questions related to the most significant predictive variables of adult social-economic position and future income, and then cross-check the responses for consistency. This could include questions related to a) *Ambition* (questions such as, asking prior to incident, "highest level of schooling anticipated obtaining" and "career aspirations" the victim had prior to the sexual assault), and b) *Family Socio-Economic Status* (questions such as, "highest education level of parent", "profession/career of family household head", and "estimated family income when in the victim was in high school")[i]. Based upon this, the economist could then estimate a future personal income of the victim based upon an appropriate weighting of, a) family background variables and b) aspiration variables, such as, the level of education that the victim aspired to when in high school. This combines both the socio-economic and aspiration components that the prior career achievement literature has found to be significant.

With respect to aspirations, however, there is also research to indicate that high school students tend to be overly optimist regarding what career they expect to have, with many selecting being physicians, professors, etc. [30]. Instead, as mentioned above, the economist might use the expected future/aspired education level when the victims were in high school (pre-incident). This is generally defined by several response options, including bachelor's degree, masters' degree, professional degree (JD, MD, etc.) or doctorate degree. The response can be converted to an income figure using Bureau of Labor Statistics report on average earnings by level of education [37].

Based upon the weighting of both the socio-economic and the aspiration components, a projected "but-for" incident income could be determined. Since a normal career path would not obtain the average national salary upon entry, for the first five years or so, it is reasonable to assume some sort of entry level income. The entry level income could be calculated from the differences between entry level wages and median wages for a number of professions, such as Collegegrad.com. For example, using eight different professions, we found that on the average, starting wages are approximately 65% of average wages.

CALCULATING IMPACT OF VICTIMIZATION

The next step in the process is to then determine the impact of victimization. In this section we examine the use of the Work Ability Index as a method to examine the impact of victimization, or any disability, on future income.

Work Ability Index and Work Ability Scale

The Work Ability Index (WAI) was originally designed to measure various factors related to an individual's ability to function in a work situation. The original WAI consisted of seven "broad" questions related to work functioning, as well as asking respondents to note which of 51 different medical conditions they have been diagnosed with. Based upon the individual item scores of the seven work dimensions and the list of conditions, a total WAI score is obtained, which could be classified ranging from "full work ability" to "unable to work". Several studies have found the WAI to be a valid instrument, with high correlation with clinically determined functional capabilities [12] [15]. However, the original WAI, with its list of 51 conditions was often considered too long and unwieldy for many applications. Radkiewich and Widerszal-Bazyl [32] investigated the psychometric properties of the original, longer version WAI and found that respondents often did not answer the "medical conditions" list accurately, and that the lengthy medical condition list in the WAI often confused respondents. Subsequently various authors have proposed shorter versions of the WAI. For example, Nubling et al [29] developed a modified WAI with only 15 medical conditions. Radkiewich and Widerszal-Bazyl [32] also found that the first question in the WAI (the global question asking respondents to compare their current work ability level with their overall best level in the past) had the highest discriminating power of all the questions in the longer WAI. Several researchers have therefore proposed simply using the first question in the WAI as a single item, "Work Ability Scale" (WAS) [15] [16] [38].

Several studies have subsequently analyzed the validity of both the WAI and WAS. El Fassi et al. [11] compared the properties of the WAI and WAS using a large sample of workers and concluded that even the shorten WAI was often incompletely filled out (28.3% of the time). In examining the psychometric characteristics of the scales, they found that the convergent validity between the WAI and the WAS was high (spearman correlation of 0.63) and that the WAS generally discriminated equally well between the various conditions presented.

In another large-scale study Schouten et al. [34] examined different versions of the WAI, and the single item WAS, with respect to actual work performance -- the likelihood of long-term sickness absence of workers. They found that a shortened version of the WAI, without the conditions list, as well as the WAS discriminated between high and low risk of long-term sickness absence, and that the WAI without the conditions list "is a good alternative to the complete WAI" (p. 301). Schouten et al. [34], however, found that the single item WAS somewhat lower in discrimination, although still over 70% accurate. After converting both the WAI and WAS to severity classifications, they found that "poor" work ability (defined by the WAI and WAS) resulted in a 0.55 risk of observed long-term sickness absence, while a "moderate" classification resulted in a 0.19 risk, a "good" classification resulted in a 0.05 risk, and an "excellent" classification resulted in a 0.02 risk. In another large-scale study of the psychometric studies of the single item WAS, Steinstra et al. [36] found that the WAS had good reliability, construct validity, and responsiveness, and showed "good measurement properties".

What is interesting in the above studies is that although both the WAI and WAS provide a numerical score, it is often converted into descriptive categories of workability severity. For example, Ilmarinen et al. [16] recommend that a score on the WAS between 0 and 5 indicates a severe impact on work, a score of 6 to 7 is a moderate impact, a score 8 is a small impact, while a 9 or 10 indicates little or no impact. In addition, many of the studies investigating the discrimination characteristics between the WAS and the WAI convert the scores into a severity classification prior to their analysis [11] [16].

While several researchers have investigated the psychometric properties of the WAI and WAS, other than the Schouten et al. [31] few studies exist that tie the workability scores with actual work activity decreases. One of the interests in the present study is to directly apply the WAI and WAS to future income capacity, particularly as related to disabilities and/or adolescent victimization.

A Pilot Study

For this analysis we use the shortened WAI (7 questions) and the WAS (first question in the WAI). In particular, the questions are:

1) Current work ability compared with the lifetime best. Assume that your work ability at its best has a value of 10 points, How many points would you give to your current work ability? (0 means that you cannot currently work at all).
2) Work ability in relation to the demands of the job. How do you rate your current work ability with respect to the physical demands of your work[1]? Very good (5), rather good (4), moderate (3), rather poor (2), very poor (1)
3) How do you rate your current work ability with respect to the mental demands of your work? Very good (5), rather good (4), moderate (3), rather poor (2), very poor (1)
4) Estimated work impairment due to condition. Is your illness or injury a hindrance to your current job. There is no hinderance (6), I am able to do my job, but is causes some symptoms (5), I must sometimes slow down my work pace or change my work methods (4), I must often slow down my work pace or change my work methods (3), Because of my condition, I feel I am able to do only part-time work (2), In my opinion, I am entirely unable to work (1).
5) Sick leave during the past 12 months. None at all (5), at the most 9 days (4), 10-24 days (3), 25-99 days (2), 100-365 days (1).
6) Own prognosis of work ability two years from now. Do you believe that, for the standpoint of your health, you will be able to do your current job two years from now? Unlikely (1), not certain (4), relatively certain (7).
7) Mental resource. Have you recently been able to enjoy your regular daily activities? Often (4), rather often (3), sometimes (2), rather seldom (1), never (0)

Sample

We administered the short WAI to a sample of 24 individuals who have suffered an injury or illness in the past three years. The scale was administered in telephone interviews. In addition, we determined the annual

[1] In this, and other questions, we refer to the work being performed prior to the injury/illness.

income prior to the injury or illness, the annual income at the time of the interview, if they had to leave their prior work due to the injury and if they have sought/obtained work in another field. We also gathered data regarding age, gender, and whether the industry/illness was associated with PTSD. In almost all cases, the respondents indicated that the injury or illness was permanent,

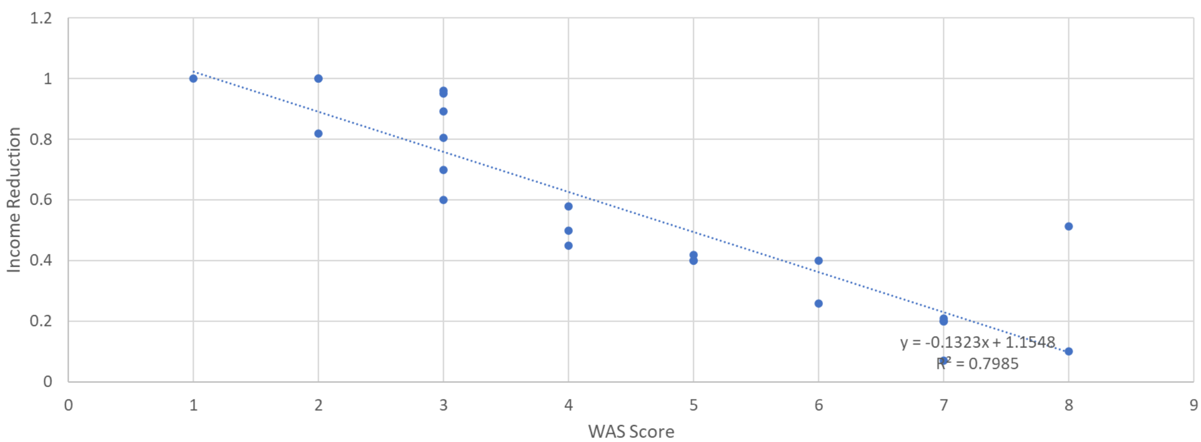
The average age of the sample is 44, with a low of 26 years and a high of 63 years. Forty-five percent of the sample are female, fifty-five percent are male. Two individuals in the sample have been diagnosed with PTSD. The average reduction in income (post-injury compared to pre-injury) was 59.9%, with a high of 100% reduction in post injury/illness income (e.g, unable to work) to a low of 7%.

Analysis

Figures 1 and 2 present the charts for the WAI and WAS respectively. A linear relationship is shown in the charts.

Figure 1: Post-Injury Income Reduction versus WAI

Figure 2: Post-Injury Income Reduction versus WAS



While we recognize that the actual relationship is asymptotic, with lower and upper limits (0,1) in the middle ranges the linear regression appears to be a good approximation (high R^2s) indicating a significant relationship with both measures of workability and post-injury/illness income reduction. We also estimated a regression model including the variables of age and gender as control variables, but neither age nor gender appeared statistically significant.[2]

We also compared the results of our WAS regressions against the severity classes suggested in prior research regarding the impact of disabilities in general on work and income. For the 7-item WAI, Ilmarinen et al [16] suggest using the classification of poor workability (7-25 points), moderate workability (28-36 points), good workability (37-43 points) and excellent workability (44-49 points). For the WAS, we used Ilmarinen et al [16] classification that 0 and 5 indicates a severe impact on work, a score of 6 to 7 represents a moderate impact, a score of 8 indicates a small impact, while 9 or 10 shows little or no impact. Although not using the WAI/WAS, a number of studies have been published that provide insight as to how disability ratings in general impact a person's income [2] [2] [4] [19] [22]. The Kessler Foundation and National Organization on Disability [19] performed a survey of Americans with Disabilities. From the information provided in the report it was possible to estimate the impact of disabilities on income. Park and Butler [31] looked at the impact of formal physician impairment ratings on wage loss while Bhattacharya et al. [4] examined permanent disability ratings on earnings loss for different impairment categories and different types of impairment categories (we report the "back" impairment category for comparison purposes). Although each of these three studies used slightly different severity classifications, given the results in these three studies, we estimated the predicted income loss based upon severity of disability and compared these impacts with our WAS regression results. The results are show in Table 2.

Table 2: WAS Impact on Income: Severity Comparison

WAS Score	Estimated Future Income Loss (Regression)	Ilmarinen Disability Classification	Proportional Earnings Loss, Kessler [18]	Proportional Earnings Loss, Bhattacharya et al [4]	Proportional Earnings Loss, Park and Butler [31]
2	0.8902	Severe	0.51 (Severe)	0.48 (Back, Disability Rating > 50%)	0.55 (Impairment Rating > 25%)
3	0.7579	Severe	0.51 (Severe)	0.48 (Back, Disability Rating > 50%)	0.55 (Impairment Rating > 25%)
4	0.6256	Severe	0.51 (Severe)	0.48 (Back, Disability Rating > 50%)	0.55 (Impairment Rating > 25%)
5	0.4933	Severe	0.51 (Severe)	0.48 (Back, Disability Rating > 50%)	0.55 (Impairment Rating > 25%)
6	0.361	Moderate	0.32 (Somewhat Severe)	0.38 (Back, Disability Rating > 30%)	0.21 (Impairment Rating 10% to 25%)
7	0.2287	Moderate	0.31 (Moderate)	0.25 (Back, Disability Rating > 20%)	0.185 (Impairment Rating 0% to 10%)
8	0.0964	Small	0.06 (Slight)	0.07 (Back, Disability Rating > 10%)	0.185 (Impairment Rating 0% to 10%)

The regression model from our sample data results in earnings loss estimates similar to the three studies examined, again suggesting the validity of the WAS as an indicator of both workability and income loss. However, due to Ilmarinen et al's [16] wide range of WAS scores in the "severe" category, for scores of "2" and "3" the regression estimates are significantly higher than the levels suggested in the three severity comparison studies. In addition, given the asymptotic nature of the data, WAS values of 0 and 1 would likely

[2] We had insufficient number of PTSD cases to include this as a control variable.

indicate a 100% income loss while WAS values of 9 and 10 would likely indicate a 0% loss, similar to Ilmarinen et al's [16] classification of "little or no" impact. Thus, a score of "6" (indicating moderate impact) on the WAS results in an average income reduction of 36.1%, or a disabled/impacted individual would be expected to earn only 63.9% of their pre-disability income.

As a final analysis, to examine whether the WAI/WAS approach might be appropriate to determine the impact of adolescent victimization, we looked at five cases of adolescent sexual assault where the victims had reached adulthood, were working, and earning income. Interviewing these five individuals, we administered the WAS. We then estimated their projected earnings capacity based upon their family income when in high school (50% weight) and educational aspiration in high school (50% weight). We then calculated the ratio of actual earnings (present) to the projected earnings capacity. Using the single item WAS score, and the regression model discussed above, we then calculated an expected loss of earnings capacity. The Pearson correlation between the predicted income using our estimated WAS regression model and the actual loss was 0.7322, indicating a strong correlation.

CONCLUSION

Sexual assaults on adolescents and children have become almost endemic, not only in the United States but throughout the world. Victims of such assaults are subject to a variety of psychological, emotion and physical problems as they mature into adults. We also know that there are long-term links between adolescent and childhood maltreatment/victimization, including sexual assaults, and later socio-economic attainment. Sexual assault victims are clearly at increased risk for financial and employment-related difficulties in adulthood. Forensic economists are often called upon to analyze these future financial difficulties when lawsuits are filed. However, by its very nature, the determination of an adolescent's future earnings capacity is very complicated. Without an established career path or income history, prediction of future career trajectories and associated income must be based on several different assumptions. Likewise, it is equally complicated to also determine the diminution of the adolescent victim's future earnings capacity due to the sexual assault incidents. This paper discusses some of the economic issues related to this problem and suggests one approach, using the workability index (WAI) and workability scale (WAS) as a possible approach that a forensic economist might consider when examining the loss of future earnings capacity for victims. The approaches offered in this paper could also be used in other types of cases where an adolescent has sustained a partial physical disability or other types of severe victimization/abuse, such as kidnapping, that might also impact the victim's future earnings capacity and socio-economic potential.

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[i] Ideally, responses to these types of questions could be confirmed from other witnesses, or relevant documents. While grades are also shown to be significant in predicting future social-economic attainment, grades as a variable are difficult to directly map into an income measure, where family socio-economic status and ambition (future school, profession, etc.) can be directly mapped into a typical income range. Grades (or test scores) might better be used to understand the difference between aspiration and ability – that is, high aspirations but low grades might limit the importance of aspirations in forecasting future earnings capacity or educational attainment [23] [28].

AMERICAN FACTORY: USING THE NETFLIX DOCUMENTARY TO TEACH INTERNATIONAL MANAGEMENT

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ABSTRACT

Fuyao Glass America (FGA) in Dayton, Ohio, is a Chinese-owned factory that makes automotive glass in a facility formerly owned by General Motors. The documentary follows the managers and key employees from the US and China starting in 2016. The film highlights cross-cultural challenges between the Chinese and American styles and expectations and also follows the attempt to unionize American employees. The 115 minute film has a 96% rating on Rotten Tomatoes website. This presentation will demonstrate examples of assignments that can follow this film in an introductory management class.

ARMA-GARCH Model with Fractional Generalized Hyperbolic Innovation

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Abstract

In this study, a multivariate ARMA-GARCH model with fractional generalized hyperbolic innovations exhibiting fat-tail, volatility clustering, and long-range dependence property is introduced. To define the fractional generalized hyperbolic process, the non-fractional generalized hyperbolic process is derived by subordinating time-changed Brownian motion to generalized inverse Gaussian process, and then the fractional generalized hyperbolic process is obtained using the Voltera kernel. Based on the new ARMA-GARCH model, the parameters are estimated for high frequency returns for six U.S. stocks, and such a model is compared with two ARMA-GARCH models with non-fractional generalized hyperbolic and normal innovations. The results show that the fractional generalized hyperbolic process has better performance in describing the behavior of the residual process of high frequency returns than the non-fractional processes considered in this study.

1 Introduction

It is an important issue to model dynamic behavior of high frequency time series returns since they carry unique characteristics which are not presented in other types of time series data. Those distinctive properties are referred to as the three stylized facts in finance: long-range dependence, fat-tail property, and volatility clustering effect. The volatility clustering effect was first noted by Mandelbrot (1963b): "Large changes tend to be followed by large changes, of either sign, and small changes tend to be followed by small changes". Fama (1970) states "Large price changes are followed by large price changes, but of unpredictable sign". Mandelbrot (1963b) also observed asset returns are highly leptokurtic and slightly asymmetric. The autoregressive conditional heteroskedastic (ARCH) formulated by Engle (1982) and the generalized ARCH (GARCH) models by Bollerslev (1986) are the first models introduced to capture the volatility clustering effect and to estimate conditional volatility [1] The standard forms of ARCH and GARCH models with normal (Gaussian) innovations successfully capture the volatility clustering but sometimes fail to adequately account for conditional leptokurtosis. Hence, a need for more flexible conditional distributions to be explored has arisen. In this sense, much research has tried to account for fat-tail property found in most financial return data: for example, the student's t-distribution (Bollerslev, 1987), non-central t-distribution (Harvey and Siddique, 1999), the generalized hyperbolic skew student's t-distribution (Aas and Haff, 2006), Johnson's SU distributio (Johnson, 1949; Yan, 2005; Rigby and Stasinopoulos, 2005; Choi and Nam, 2008; Naguez and Prigent, 2017; Naguez, 2018), the generalized error distribution (GED) (Nelson, 1991; Baillie and Bollerslev, 2002), and the Laplace distribution (Granger and Ding, 1995). These distributions, however, generally have numerous issues in the applications even though for some cases they may be capable, the issues including that a GED distribution does not have sufficient fat-tail to account for extreme events and that the density of a non-central t-distribution has the sum of an infinite series.

Besides, during the past decades there have been growing interests in other types of fat-tail distributions in finance, including a generalized hyperbolic distribution (Barndorff-Nielsen, 1977), a normal inverse Gaussian distribution (Barndorff-Nielsen, 1995), a variance gamma distribution (Madan and Seneta, 1990), a stable distribution (Mandelbrot, 1963a; Liu and Brorsen, 1995; Panorska et al., 1995; Mittnik et al., 1998; Mittnik and Paolella, 2003), a tempered stable distribution (Rosiński, 2007; Kim et al., 2009), and many others. Especially, the generalized hyperbolic distribution is a very general form which involves

[1] One can find a large number of specifications of ARCH and GARCH models in the literature which have been considered for financial market data. Readers are referred to the surveys on those models by Bera and Higgins (1993), Bollerslev et al. (1992), Bollerslev et al. (1994), Gourieroux (1997), and Li et al. (2002).

other types of distributions as special cases, such as a student's t-distribution, a hyperbolic distribution, a normal inverse Gaussian distribution, a variance gamma distribution, and a Laplace distribution (Anderson, 2001; Jensen and Lunde, 2001; Venter and De Jongh, 2002; Forsberg and Bollerslev, 2002; Stentoft, 2008). Although the fat-tail distributions forementioned had been studied for the empirical innovations in ARMA-GARCH models to capture the fat-tail property on financial return data, Sun et al. (2008) and Beck et al. (2013) evoke that those distributions have the inability to fully describe the stylized facts especially in high frequency time series analysis.

On the other hand, since Mandelbrot and Van Ness (1968) introduced a fractional Brownian motion [2] to explain short-range and long-range dependence, a large number of empirical studies on asset prices (Lo, 1991; Cutland et al., 1995; Willinger et al., 1999; Robinson, 2003; Casas and Gao, 2008; Chronopoulou and Viens, 2012; Cont, 2005; Mariani et al., 2009; Cheridito, 2003; Comte and Renault, 1998; Rosenbaum, 2008) have investigated long-range dependence properties of asset returns. In the sense that the fractional Brownian motion can capture the long-range dependence properties, the ARCH and GARCH models with innovations utilizing the fractional Brownian motion can capture not only the long-range dependence but the volatility clustering effect on high frequency return data; the fat-tail properties, however, are still not taken into account. Hence, in an attempt to better describe high frequency returns, Sun et al. (2008) offered a univariate model having three stylized facts by taking ARMA-GARCH model with fractional stable distributed residuals and suggested that the model effectively performs in high frequency returns. Also, Kim (2012) introduced the fractional multivariate normal tempered stable process as a subclass of the fractional stable process [3] by using the time-changed fractional Brownian motion with the fractional tempered stable subordinator. The fractional tempered stable process was redefined by Kim (2015) with the stochastic integral for the Volterra kernel presented in Houdre and Kawai (2006) and was applied to the innovations on the multivariate ARMA-GARCH model [4]. In addition, Kozubowski et al. (2006) applied a fractional Laplace motion by subordinating a fractional Brownian motion to a gamma process to model financial time series. The fractional normal inverse Gaussian process was proposed by Kumar

[2] For more details regarding the fractional Brownian Motion, refer to Biagini et al. (2008), Coutin (2007), Doukhan et al. (2002), Kaarakka and Salminen (2011) and so forth.

[3] Refer to Samorodnitsky and Taqqu (1994) for stable process.

[4] The fractional tempered stable process is also discussed on the option pricing by Kim et al. (2019).

et al. (2011) and Kumar and Vellaisamy (2012).

Much research forementioned addresses wide issues: especially, the simulation and the parameter estimations in the processes with long-range dependence as well as the detection of the long-range dependence. This study is motivated by the availability of high frequency time series return data and by the need for a new market model accommodating three stylized facts. The model is constructed by implementing the fractional generalized hyperbolic innovations on multivariate ARMA-GARCH model. The generalized hyperbolic process is derived by using time-changed Brownian motion with the generalized inverse Gaussian subordinator. Then, univariate fractional generalized hyperbolic process is defined by the stochastic integral for the Volterra kernel. The basic properties and covariance structure on multivariate fractional generalized hyperbolic process are discussed, and the numerical method to generate the sample paths of the processes is presented. Using the high frequency stock return data, the parameter estimations on ARMA-GARCH model with the fractional generalized hyperbolic innovations are provided, and the goodness-of-fit tests are performed for the estimated parameters to validate the model.

The purpose of this study is three-fold. Firstly, a new ARMA-GARCH model accounting for three stylized facts is presented to give the broad framework of an alternative model that can be used in financial economic applications. Secondly, we look into whether considering three stylized facts especially with a fractional generalized hyperbolic innovation produces superior forecast estimates, and thereby motivate its use in effectively managing financial risk as well as optimizing portfolio in high frequency time series return data. Lastly, this study calls for attention to an assumption underlying the mean-variance model (Markowitz, 1952) applied to high frequency returns, the assumption that asset returns are normally distributed. By being the first to derive a fractional generalized hyperbolic process using time-changed Brownian motion, we contribute to the empirical literature on modeling for the financial risk management and portfolio management. In the portfolio optimization based on Markowitz's mean-variance model, the Gaussian assumption can be replaced by the ARMA-GARCH model with the fractional generalized hyperbolic innovations, and the portfolio value-at-risk (VaR) and average value-at-risk (AVaR) based on the model can supersede the variance risk measure.

The remainder of this paper is organized as follows. In the next section, the notion of long-range dependence is discussed, time-changed Brownian motion is reviewed, the generalized hyperbolic process is derived from the time-changed Brownian motion, and the fractional generalized hyperbolic process as well as the covariance structure for two elements of the processes are discussed. Section 3 is devoted to the simulation of the fractional generalized hyperbolic processes and the illustration on the sample paths for representative values of parameters. Multivariate ARMA-GARCH model having long-range dependence is defined in Section 4 with empirical illustration. The main findings and implications are summarized in Section 5.

2 Models and Methodology

This section reviews background knowledge about long-range dependence and generalized hyperbolic process. Then, a fractional generalized hyperbolic process is derived.

2.1 Long-range Dependence

Long-range dependence in a stochastic process is usually defined based on its autocorrelation functions. While short memory stationary process usually refers to the stochastic process whose autocorrelation functions decay fast and its spectral density is bounded everywhere, long memory process [5] has the property that is associated with slow decay of autocorrelation functions as well as a certain type of scaling linked to self-similar processes. Although the notion of long-range dependence varies from author to author, the commonly used notion of long-range dependence is recalled in terms of the autocorrelation function of a process. For lag k, a stationary process with autocorrelation function $\rho(k)$ is referred to as a process with long-range dependence if

$$\sum_{k=0}^{\infty} |\rho(k)|$$

does not converge. By this notion, the absolute autocorrelations are not integrable. Namely, a weakly stationary process is said to have long-range dependence if $\rho(\cdot)$ hyperbolically decays, that is, $\rho(k) \sim L(k)k^{2d-1}$ as $k \to \infty$, $0 < d < \frac{1}{2}$, where $L(k)$ is a slowly varying function as $x \to \infty$, if for every positive

[5] Long memory and long-range dependence are synonymous notions.

constant c,

$$\lim_{x\to\infty}\frac{L(cx)}{L(x)}$$

exists and is equal to 1. Hence, the length of memory in a stochastic process is measured by a rate at which its correlations decay with lag. For illustration, suppose an autocorrelation function $\rho(\cdot)$ of an ARMA process at lag k. The function converges rapidly to zero as $k \to \infty$ in the sense that there exists $r > 1$ such that

$$r^k\rho(k) \to 0 \qquad \text{as } k \to \infty.$$

The correlations for ARMA processes in this case decay exponentially fast with k. On the other hand, consider the autocorrelation function $\rho(k)$ of FARIMA(p, d, q) process with $0 < |d| < \frac{1}{2}$. Such an autocorrelation function has the following property:

$$\rho(k)k^{1-2d} \to c \qquad \text{as } k \to \infty,$$

indicating $\rho(k)$ converges to zero as $k \to \infty$ at a much slower rate than that of an ARMA process. Therefore, it is noticed that ARMA processes are regarded to have short memory, and FARIMA processes are regarded to exhibit long memory. Likewise, the long-range dependence property depends on the behavior of the autocorrelation function at large lags. However, it may be difficult to empirically estimate the long-range dependence property (Beran, 1994). Thus, the self-similar processes are often used to formulate the models with the long-range dependence property. A stochastic process $\{X(t)\}_{t\geq 0}$ is said to be self-similar if there exists $H > 0$ such that for any scaling factor $c > 0$, the processes $\{X(t)\}_{t\geq 0}$ and $\{c^H X(t)\}_{t\geq 0}$ have the same law:

$$\{X(ct)\}_{t\geq 0} \stackrel{d}{=} \{c^H X(t)\}_{t\geq 0},$$

where H is called the self-similarity exponent of the process X. For a continuous stochastic process x_t, let us assume $x_0 = 0$, $\mathrm{E}[x_t] = 0$, and the increments $X(t) = x_t - x_{t-1}$ are stationary with $Var(X(t)) = \sigma^2$.

Then, we have:

$$\mathrm{cov}(X(t),\ X(t+k)) = \mathrm{cov}(X(1), X(1+k))$$

$$= \frac{1}{2}\Big[\mathrm{E}\big[(x_{k+1}-x_0)^2\big] + \mathrm{E}\big[(x_{k-1}-x_0)^2\big] - 2\mathrm{E}\big[(x_k-x_0)^2\big]\Big].$$

By self-similarity property, the correlation is

$$\rho(k) = corr(X(t), X(t+k)) = \frac{1}{2}\Big[(k+1)^{2H} - 2k^{2H} + (k-1)^{2H}\Big]$$

$$= \frac{1}{2}k^{2H}\left[\left(1+\frac{1}{k}\right)^{2H} - 2 + \left(1-\frac{1}{k}\right)^{2H}\right].$$

By L'Hopital's rule,

$$\rho(k) \sim H(2H-1)k^{2H-2} \qquad \text{as } k \to \infty. \tag{1}$$

Thus, $\lim_{n\to\infty}\sum_{k=-n}^{k-n}\rho(k)$ exist if and only if $H<\frac{1}{2}$, and $H>\frac{1}{2}$ implies that the series does not converge, so that $X(t)$ is a long memory process.

2.2 Time-Changed Brownian Motion

By substituting the usual deterministic time t as a subordinator $T=\{T(t)\}_{t\geq 0}$ in a stochastic process $Y=\{Y(t)\}_{t\geq 0}$, we have a new process $X=\{X(t)\}_{t\geq 0}$, and Y is said to be subordinated by process T. Namely,

$$X(t) = Y(T(t)).$$

Hence, we change time to the stochastic process Y in order to run on a "new clock" whose stochastic time is dominated by the subordinator T. Intuitively, it can be thought of as the business time (or trading time) that can be viewed as stochastic. If we employ an arithmetic Brownian motion subordinated by a subordinator, then we obtain the time-changed Brownian motion. More specifically, considering a subordinator $T=\{T(t)\}_{t\geq 0}$ independet of the standard Brownian motion $\{B(t)\}_{t\geq 0}$, we have a new process $X = \{X(t)\}_{t\geq 0}$, which is called time-changed Brownian motion, by substituting physical time t as the subordinator T as follows:

$$X(t) = \mu T(t) + \sigma B(T(t)).$$

Letting $\mathcal{F}_T(t)$ be the filtration of T, we can derive the characteristic function $\phi_{X(t)}$ by subordination theorem (Cont and Tankov, 2004; Barndorff-Nielsen and Levendorskii, 2001; Sato, 1999). That is,

$$\begin{aligned}\phi_{X(t)}(u) &= \mathrm{E}\Big[\mathrm{E}\big[\exp\big(iu(\mu T(t) + \sigma B(T(t)))\big) \mid \mathcal{F}_T(t)\big]\Big] \\ &= \mathrm{E}\Big[\exp\Big(iu\mu T(t) - \frac{u^2\sigma^2}{2}T(t)\Big)\Big] \\ &= \phi_{T(t)}\Big(u\mu + \frac{iu^2\sigma^2}{2}\Big),\end{aligned}$$

where $\phi_{T(t)}$ is the characteristic function of subordinator $T(t)$. A Lévy process can be constructed by subordinating a Brownian motion with a particular subordinator (Clark, 1973). Therefore, the subordination is used as a constructive tool in order to define a particular class of Lévy processes. A generalized hyperbolic process is presented by applying time-changed Brownian motion in the next section.

2.3 Generalized Hyperbolic Process

The density function of the generalized inverse Gaussian distribution described by three parameters $(\lambda, \delta, \gamma)$ is given by

$$f_{GIG}(x) = \frac{(\gamma/\delta)^\lambda}{2Y_\lambda(\delta\gamma)} x^{\lambda-1} \exp\Big(-\frac{1}{2}\big(\delta^2 x^{-1} + \gamma^2 x\big)\Big), \qquad x > 0,$$

where Y_λ is the modified Bessel function of the second kind with index λ as follows:

$$Y_\lambda(x) = \int_0^\infty u^{\lambda-1} \exp\Big(-\frac{1}{2}x\big(u^{-1} + u\big)\Big)du, \qquad x > 0.$$

The parameter domain of the generalized inverse Gaussian distribution is

$$\delta > 0, \quad \gamma \geq 0, \quad \text{if } \lambda < 0,$$

$$\delta > 0, \quad \gamma > 0, \quad \text{if } \lambda = 0,$$

$$\delta \geq 0, \quad \gamma > 0, \quad \text{if } \lambda > 0.$$

Proposition 2.1. *The characteristic function of a generalized inverse Gaussian random variable G is given by*

$$\phi_G(u) = \left(\frac{\gamma}{\sqrt{\gamma^2 - 2iu}}\right)^{\lambda} \frac{Y_\lambda(\delta\sqrt{\gamma^2 - 2iu})}{Y_\lambda(\delta\gamma)}, \qquad \delta, \gamma > 0.$$

Proof. Let $q(\lambda, \delta, \gamma) = \left(\frac{\gamma}{\delta}\right)^{\lambda} \frac{1}{2Y_\lambda(\delta\gamma)}$ denote the norming constant of the generalized inverse Gaussian density, then the characteristic function of G is

$$\phi_G(u) = \mathrm{E}\big[e^{iuG}\big] = \int_0^\infty q(\lambda, \delta, \gamma) g^{\lambda-1} \exp\Big(-\frac{1}{2}\big(\delta^2 g^{-1} + (\gamma^2 - 2iu)g\big)\Big) dg$$

$$= \frac{q(\lambda, \delta, \gamma)}{q(\lambda, \delta, \sqrt{\gamma^2 - 2iu})} = \left(\frac{\gamma}{\sqrt{\gamma^2 - 2iu}}\right)^{\lambda} \frac{Y_\lambda(\delta\sqrt{\gamma^2 - 2iu})}{Y_\lambda(\delta\gamma)}. \qquad \square$$

With the same approach in the proof of Proposition 2.1, the rth moments can be derived as follows: given a generalized inverse Gaussian random variable G with parameters $(\lambda, \delta, \gamma)$,

$$\mathrm{E}[G^r] = \int_0^\infty q(\lambda, \delta, \gamma) g^r g^{\lambda-1} \exp\Big(-\frac{1}{2}\big(\delta^2 g^{-1} + \gamma^2 g\big)\Big) dg$$

$$= \frac{q(\lambda, \delta, \gamma)}{q(\lambda + r, \delta, \gamma)} = \left(\frac{\delta}{\gamma}\right)^{r} \frac{Y_{\lambda+r}(\delta\gamma)}{Y_\lambda(\delta\gamma)}, \tag{2}$$

where $q(\lambda, \delta, \gamma)$ again denotes the norming constant of the corresponding generalized inverse Gaussian density. In this study, we set the expected value of the generalized inverse Gaussian random variable G

to be one, i.e. $\mathrm{E}[G] = 1$. By the moment formula of Equation (2), its expected value is defined by

$$\mathrm{E}[G] = \left(\frac{\delta}{\gamma}\right)\frac{Y_{\lambda+1}(\delta\gamma)}{Y_\lambda(\delta\gamma)} = 1,$$

and set

$$\alpha = \delta\gamma.$$

Then, we have a generalized inverse Gaussian random variable G under parameterization (λ, α). It follows identity

$$\gamma = \alpha\left(\frac{Y_{\lambda+1}(\alpha)}{Y_\lambda(\alpha)}\right)^{\frac{1}{2}} \qquad \text{and} \qquad \delta = \alpha\left(\frac{Y_\lambda(\alpha)}{Y_{\lambda+1}(\alpha)}\right)^{\frac{1}{2}}.$$

Hence, the variance of G is given by

$$\mathrm{Var}(G) = \frac{Y_\lambda(\alpha)\ Y_{\lambda+2}(\alpha)}{Y^2_{\lambda+1}(\alpha)} - 1.$$

By infinite divisibility of a generalized inverse Gaussian distribution (Barndorff-Nielson and Halgreen, 1977), the characteristic function of a generalized inverse Gaussian process $\{G(t)\}_{t\geq 0}$ with parameters (λ, α) is

$$\phi_{G(t)}(u) = \left(\nu(\lambda,\alpha)^\lambda\ \frac{Y_\lambda\big(\alpha\ \nu(\lambda,\alpha)^{-1}\big)}{Y_\lambda(\alpha)}\right)^t,$$

where $\nu(\lambda,\alpha) = \left(\frac{\alpha^2\ Y_{\lambda+1}(\alpha)}{\alpha^2\ Y_{\lambda+1}(\alpha) - 2iuY_\lambda(\alpha)}\right)^{\frac{1}{2}}$.

In the remainder of this paper, we assume that N is a positive integer standing for the dimension, and $\beta = (\beta_1, \beta_2, \cdots, \beta_N)^T$, $\theta = (\theta_1, \theta_2, \cdots, \theta_N)^T$, and $\Sigma = [\sigma_{m,n}]_{m,n\in\{1,2,\cdots,N\}}$ is a correlation matrix such that $\sigma_{n,n} = 1$ for $n \in \{1, 2, \cdots, N\}$. Then, consider a N-dimensional Brownian motion $B = \{B(t)\}_{t\geq 0}$, such that $B(t) = (B_1(t), B_2(t), \ \cdots, B_N(t))^T$, and suppose that $\mathrm{cov}(B_m(t), B_n(t)) = \sigma_{m,n}t$ for all $m, n \in \{1, 2, \ \cdots, N\}$ and that B and the generalized inverse Gaussian process $\{G(t)\}_{t\geq 0}$ with parameters (λ, α) are independent. Also, consider N-dimensional process $X = \{X(t)\}_{t\geq 0}$ with $X(t) = (X_1(t), X_2(t), \ \cdots, X_N(t))^T$. For $n \in \{1, 2, \ \cdots, N\}$, we define $\{X(t)\}_{t\geq 0}$ by the time-changed Brownian motion as

$$X_n(t) = \beta_n(G(t) - t) + \theta_n B_n(G(t)). \tag{3}$$

Then, the process X is referred to as the N-dimensional generalized hyperbolic process with parameters $(\lambda, \alpha, \beta, \theta, \Sigma)$. We define the characteristic function of a generalized hyperbolic process $X_n(t)$ in the following proposition.

Proposition 2.2. *The characteristic function of a generalized hyperbolic process $X_n(t)$ is given by*

$$\phi_{X_n(t)}(u) = \left(\exp\big(-iu\beta_n\big)\ \nu_1(\lambda, \alpha, \beta_n, \theta_n)^{\lambda}\ \frac{Y_\lambda\big(\alpha\ \nu_1(\lambda, \alpha, \beta_n, \theta_n)^{-1}\big)}{Y_\lambda(\alpha)} \right)^t,$$

where $\nu_1(\lambda, \alpha, \beta_n, \theta_n) = \left(\frac{\alpha^2\ Y_{\lambda+1}(\alpha)}{\alpha^2\ Y_{\lambda+1}(\alpha) - 2iu\left(\beta_n + \frac{iu\theta_n^2}{2}\right) Y_\lambda(\alpha)} \right)^{\frac{1}{2}}$.

Proof. Since for all $t \geq 0$ we have $\log \phi_{G(t)}(u) = t \log \phi_{G(1)}(u)$, the characteristic function of $X_n(t)$ is

$$\begin{aligned}
\phi_{X_n(t)}(u) &= \mathrm{E}\big[e^{iuX_n(t)}\big] = \mathrm{E}\Big[\exp\Big(iu\Big(\beta_n\big(G(t) - t\big) + \theta_n B_n\big(G(t)\big)\Big)\Big)\Big] \\
&= \mathrm{E}\Big[\exp\big(iu\beta_n G(t) - iu\beta_n t\big)\ \mathrm{E}\Big[\exp\Big(iu\theta_n B_n\big(G(t)\big)\Big)\ \Big|\ G(t)\Big]\Big] \\
&= \exp\big(-iu\beta_n t\big)\ \mathrm{E}\Big[\exp\Big(iu\beta_n G(t) - \frac{u^2\theta_n^2}{2} G(t)\Big)\Big] \\
&= \exp\big(-iu\beta_n t\big)\ \phi_{G(t)}\left(u\left(\beta_n + \frac{iu\theta_n^2}{2}\right)\right) \\
&= \left(\exp\big(-iu\beta_n\big)\ \nu_1(\lambda, \alpha, \beta_n, \theta_n)^{\lambda}\ \frac{Y_\lambda\big(\alpha\ \nu_1(\lambda, \alpha, \beta_n, \theta_n)^{-1}\big)}{Y_\lambda(\alpha)} \right)^t,
\end{aligned}$$

where $\nu_1(\lambda, \alpha, \beta_n, \theta_n) = \left(\frac{\alpha^2\ Y_{\lambda+1}(\alpha)}{\alpha^2\ Y_{\lambda+1}(\alpha) - 2iu\left(\beta_n + \frac{iu\theta_n^2}{2}\right) Y_\lambda(\alpha)} \right)^{\frac{1}{2}}$. □

Furthermore, the covariance between $X_m(t)$ and $X_n(t)$ is

$$\operatorname{cov}\big(X_m(t), X_n(t)\big) = t\left[\beta_m\beta_n\left(\frac{Y_\lambda(\alpha)\;Y_{\lambda+2}(\alpha)}{Y^2_{\lambda+1}(\alpha)} - 1\right) + \theta_m\theta_n\sigma_{m,n}\right]. \tag{4}$$

Also, the variance of $X_n(t)$ is equal to

$$\operatorname{Var}(X_n(t)) = t\left[\beta_n^2\left(\frac{Y_\lambda(\alpha)\;Y_{\lambda+2}(\alpha)}{Y^2_{\lambda+1}(\alpha)} - 1\right) + \theta_n^2\right]. \tag{5}$$

2.4 Fractional Generalized Hyperbolic Process

The Voltera kernel $K_H : [0,\infty) \times [0,\infty) \to [0,\infty]$ is employed to define generalized hyperbolic process with long-range dependence.

$$K_H(t,\ s) = c_H\left(\left(\frac{t}{s}\right)^{H-\frac{1}{2}}(t-s)^{H-\frac{1}{2}} - \left(H-\frac{1}{2}\right)s^{\frac{1}{2}-H}\int_s^t u^{H-\frac{3}{2}}(u-s)^{H-\frac{1}{2}}du\right)\mathbb{1}_{[0,t]}(s)$$

with

$$c_H = \left(\frac{H(1-2H)\Gamma(\frac{1}{2}-H)}{\Gamma(2-2H)\Gamma(H+\frac{1}{2})}\right)^{\frac{1}{2}} \qquad \text{and} \quad H \in (0,1).$$

Also, the following facts are provided by Houdre and Kawai (2006) and Nualart (2003):

1) For $t, s > 0$,

$$\int_0^{t\wedge s} K_H(t,\ u)K_H(s,\ u)du = \frac{1}{2}\big(t^{2H} + s^{2H} - |t-s|^{2H}\big), \tag{6}$$

and

$$\int_0^t K_H(t,s)^2 ds = t^{2H} \tag{7}$$

2) If $H \in (\frac{1}{2}, 1)$, then

$$K_H(t,s) = c_H\left(H-\frac{1}{2}\right)s^{\frac{1}{2}-H}\int_s^t (u-s)^{H-\frac{3}{2}}u^{H-\frac{1}{2}}du\ \mathbb{1}_{[0,t]}(s),$$

and $K_{\frac{1}{2}}(t,s) = \mathbb{1}_{[0,t]}(s)$.

3) Let $t > 0$ and $p \geq 2$. $K_H(t,\cdot) \in L^p([0,t])$ if and only if $H \in \left(\frac{1}{2} - \frac{1}{p},\ \frac{1}{2} + \frac{1}{p}\right)$. When $K_H(t,\ \cdot) \in L^p([0,t])$,

$$\int_0^t K_H(t,s)^p ds = C_{H,p}\ t^{p(H-\frac{1}{2})+1},$$

where

$$C_{H,p} = c_H^p \int_0^1 v^{p(\frac{1}{2}-H)} \left[(1-v)^{H-\frac{1}{2}} - \left(H - \frac{1}{2}\right) \int_v^1 w^{H-\frac{3}{2}} (w-v)^{H-\frac{1}{2}} dw\right]^p dv.$$

Let $K_H(t,s)$ be the Voltera kernel and $X \sim GH_N(\lambda, \alpha, \beta, \theta, \Sigma)$. The N-dimensional fractional generalized hyperbolic process generated by X is defined by the process of vector $Z = \{Z(t)\}_{t\geq 0}$ with $Z(t) = (Z_1(t), Z_2(t),\ \cdots, Z_N(t))^T$ such that

$$Z_n(t) = \lim_{||p|| \to 0} \sum_{j=1}^{M} K_H(t, t_{j-1})(X_n(t_j) - X_n(t_{j-1}))$$

for $n \in \{1, 2,\ \cdots, N\}$, where

$$P : 0 = t_0 < t_1 < \cdots < t_M = t$$

is a partition of the interval $[0,t]$ and

$$||P|| = \max\{t_j - t_{j-1} \mid j = 1, 2,\ \cdots, M\}.$$

We denote that $Z_n(t) = \int_0^t K_H(t,s)dX_n(s)$ and $Z \sim fGH_N(H,\lambda,\alpha,\beta,\theta,\Sigma)$. Then, we have

$$\mathrm{E}\Big[\exp\Big(iu\sum_{j=1}^{M} K_H(t,t_{j-1})\big(X_n(t_j)-X_n(t_{j-1})\big)\Big)\Big]$$

$$=\prod_{j=1}^{M}\mathrm{E}\Big[\exp\Big(iuK_H(t,t_{j-1})\big(X_n(t_j)-X_n(t_{j-1})\big)\Big)\Big]$$

$$=\exp\Bigg(-\sum_{j=1}^{M} iu\beta_n K_H(t,t_{j-1})(t_j-t_{j-1})$$

$$+\sum_{j=1}^{M}(t_j-t_{j-1})\log\Bigg(\nu_2(\lambda,\alpha,\beta_n,\theta_n)^{\lambda}\ \frac{Y_\lambda\big(\alpha\ \nu_2(\lambda,\alpha,\beta_n,\theta_n)^{-1}\big)}{Y_\lambda(\alpha)}\Bigg)\Bigg),$$

where $\nu_2(\lambda,\alpha,\beta_n,\theta_n) = \left(\frac{\alpha^2\ Y_{\lambda+1}(\alpha)}{\alpha^2\ Y_{\lambda+1}(\alpha)-2iuK_H(t,s)\left(\beta_n+\frac{iu\theta_n^2}{2}\right)Y_\lambda(\alpha)}\right)^{\frac{1}{2}}$. Therefore, the characteristic function of $Z_n(t)$ is given by

$$\phi_{Z_n(t)}(u) = \lim_{||p||\to 0}\exp\Bigg(-\sum_{j=1}^{M} iu\beta_n K_H(t,t_{j-1})(t_j-t_{j-1})$$

$$+\sum_{j=1}^{M}(t_j-t_{j-1})\log\Bigg(\nu_2(\lambda,\alpha,\beta_n,\theta_n)^{\lambda}\ \frac{Y_\lambda\big(\alpha\ \nu_2(\lambda,\alpha,\beta_n,\theta_n)^{-1}\big)}{Y_\lambda(\alpha)}\Bigg)\Bigg)$$

$$=\exp\Bigg(-iu\beta_n\int_0^t K_H(t,s)\ ds+\int_0^t\log\Bigg(\nu_2(\lambda,\alpha,\beta_n,\theta_n)^{\lambda}\ \frac{Y_\lambda\big(\alpha\ \nu_2(\lambda,\alpha,\beta_n,\theta_n)^{-1}\big)}{Y_\lambda(\alpha)}\Bigg)ds\Bigg).$$

Proposition 2.3. *For $n \in \{1,2,\ \cdots,N\}$, the covariance between $Z_n(s)$ and $Z_n(t)$ is equal to*

$$\mathrm{cov}\big(Z_n(s),Z_n(t)\big) = \frac{1}{2}\Bigg(\beta_n^2\Bigg(\frac{Y_\lambda(\alpha)\ Y_{\lambda+2}(\alpha)}{Y_{\lambda+1}^2(\alpha)}-1\Bigg)+\theta_n^2\Bigg)\Big(t^{2H}+s^{2H}-|t-s|^{2H}\Big).$$

Proof.

$$P : 0 = t_0 < t_1 < \cdots < t_{M-1} < t_M$$

$$= s \wedge t < t_{M+1} < \cdots < t_{M^*} = s \vee t$$

Then, we have

$$\mathrm{cov}\big(Z_n(s), Z_n(t)\big) = \mathrm{E}[Z_n(s)Z_n(t)]$$

$$= \lim_{||P||\to 0} \mathrm{E}\left[\sum_{j=1}^{M} K_H(s, t_{j-1})\big(X_n(t_j) - X_n(t_{j-1})\big) \sum_{k=1}^{M^*} K_H(t, t_{k-1})\big(X_n(t_k) - X_n(t_{k-1})\big)\right]$$

$$= \lim_{||P||\to 0} \sum_{j=1}^{M} \sum_{k=1}^{M^*} K_H(s, t_{j-1}) K_H(t, t_{k-1}) \mathrm{E}\Big[\big(X_n(t_j) - X_n(t_{j-1})\big)\big(X_n(t_k) - X_n(t_{k-1})\big)\Big].$$

By the property of the generalized hyperbolic process X_n, we have

$$\mathrm{E}\Big[\big(X_n(t_j) - X_n(t_{j-1})\big)\big(X_n(t_k) - X_n(t_{k-1})\big)\Big]$$

$$= \begin{cases} (t_j - t_{j-1}) Var\big(X_n(1)\big) & \text{if } j = k \\ 0 & \text{if } j \neq k. \end{cases}$$

Hence, we obtain

$$\mathrm{cov}\big(Z_n(s), Z_n(t)\big) = \lim_{||P||\to 0} \sum_{j=1}^{M} K_H(s, t_{j-1}) K_H(t, t_{j-1})(t_j - t_{j-1}) Var(X_n(1))$$

$$= Var(X_n(1)) \int_0^{s\wedge t} K_H(s, u) K_H(t, u)\ du$$

From Equation (5) and (6),

$$\operatorname{cov}\big(Z_n(s), Z_n(t)\big) = \frac{1}{2}\Bigg(\beta_n^2\bigg(\frac{Y_\lambda(\alpha)\ Y_{\lambda+2}(\alpha)}{Y_{\lambda+1}^2(\alpha)} - 1\bigg) + \theta_n^2\Bigg)\Big(t^{2H} + s^{2H} - |t-s|^{2H}\Big).$$

$\square$

Proposition 2.4. *For $m, n \in \{1, 2, \cdots, N\}$, the covariance between $Z_m(t)$ and $Z_n(t)$ is equal to*

$$\operatorname{cov}\big(Z_m(t), Z_n(t)\big) = t^{2H}\Bigg(\beta_m\beta_n\bigg(\frac{Y_\lambda(\alpha)\ Y_{\lambda+2}(\alpha)}{Y_{\lambda+1}^2(\alpha)} - 1\bigg) + \theta_m\theta_n\sigma_{m,n}\Bigg).$$

Proof. Let P be a partition such that

$$P : 0 = t_0 < t_1 < \cdots < t_{M-1} < t_M = t.$$

We have

$$\operatorname{cov}\big(Z_m(t), Z_n(t)\big) = \mathrm{E}\big[Z_m(t), Z_n(t)\big]$$

$$= \lim_{||P||\to 0} \mathrm{E}\Bigg[\sum_{j=1}^{M} K_H(s, t_{j-1})\big(X_m(t_j) - X_m(t_{j-1})\big)\sum_{k=1}^{M} K_H(t, t_{k-1})\big(X_n(t_k) - X_n(t_{k-1})\big)\Bigg].$$

$$= \lim_{||P||\to 0} \sum_{j=1}^{M}\sum_{k=1}^{M} K_H(t, t_{j-1})K_H(t, t_{k-1})\mathrm{E}\Big[\big(X_m(t_j) - X_m(t_{j-1})\big)\big(X_n(t_k) - X_n(t_{k-1})\big)\Big].$$

By the property of the generalized hyperbolic process, we have

$$\mathrm{E}\Big[\big(X_m(t_j) - X_m(t_{j-1})\big)\big(X_n(t_k) - X_n(t_{k-1})\big)\Big]$$

$$= \begin{cases} (t_j - t_{j-1})\ \operatorname{cov}\big(X_m(1), X_n(1)\big) & \text{if } j = k \\ 0 & \text{if } j \neq k \end{cases}$$

Hence, we obtain

$$\operatorname{cov}\big(Z_m(t), Z_n(t)\big) = \operatorname{cov}\big(X_m(1), X_n(1)\big) \int_0^t \big(K_H(t,u)\big)^2 \, du$$

From Equation (4) and (7),

$$\operatorname{cov}\big(Z_m(t), Z_n(t)\big) = t^{2H}\left(\beta_m\beta_n\left(\frac{\mathrm{Y}_\lambda(\alpha)\ \mathrm{Y}_{\lambda+2}(\alpha)}{\mathrm{Y}^2_{\lambda+1}(\alpha)} - 1\right) + \theta_m\theta_n\sigma_{m,n}\right).$$

□

For a given stochastic process $Y = \{Y(t)\}_{t\geq 0}$, the summation

$$\sum_{j=1}^{\infty} \mathrm{E}\Big[\big(Y(1) - Y(0)\big)\big(Y(j+1) - Y(j)\big)\Big]$$

diverges. By Proposition 2.3 and Equation (1),

$$\begin{aligned}
\mathrm{E}\Big[Z_n(1)\big(Z_n(j+1) - Z_n(j)\big)\Big] &= \frac{\eta}{2}\Big((j+1)^{2H} - 2j^{2H} + (j-1)^{2H}\Big) \\
&= \frac{\eta}{2} j^{2H-2}\left(j^2\left(\left(1+\frac{1}{j}\right)^{2H} - 2 + \left(1-\frac{1}{j}\right)^{2H}\right)\right) \\
&\to \eta H(2H-1)j^{2H-2} \quad \text{as } j \to \infty,
\end{aligned}$$

where $\eta = \beta_n^2\Big(\frac{\mathrm{Y}_\lambda(\alpha)\ \mathrm{Y}_{\lambda+2}(\alpha)}{\mathrm{Y}^2_{\lambda+1}(\alpha)} - 1\Big) + \theta_n^2$. Hence, $\sum_{j=1}^{\infty} \mathrm{E}\big[Z_n(1)\big(Z_n(j+1) - Z_n(j)\big)\big]$ diverges, i.e. the process $\{Z(t)\}_{t\geq 0}$ has long-range dependence when $\frac{1}{2} < H < 1$.

3 Simulation

In this section, the sample paths of the fractional generalized hyperbolic processes are simulated by subordinating a discretized generalized inverse Gaussian process with fractional Brownian motion on equally spaced intervals. First of all, the generalized inverse Gaussian process $G(t)$ is simulated as follows:

1) Choose M fixed times in $[0,t]$: $t_0 = 0, t_1 = t/M, \cdots, t_{M-1} = (M-1)t/M$, and $t_M = t$.

2) Generate M generalized inverse Gaussian variates $(G(t_1), G(t_2), \cdots, G(t_M))$.

Let L_Σ be the lower triangular matrix obtained by the Cholesky decomposition for Σ with $\Sigma = L_\Sigma L_\Sigma^T$, where Σ is the correlation matrix in Equation (8). Then, we have a mutually independent vector of Brownian motions $\bar{B}(t) = (\bar{B}_1(t), \bar{B}_2(t), \cdots, \bar{B}_N(t))^T$.

The sample paths of $X \sim GH_N(\lambda, \alpha, \beta, \theta, \Sigma)$ is generated as follows. For a given partition in 1) above,

$$\bar{B}_n(G(t_j)) - \bar{B}_n(G(t_{j-1})) = \sqrt{G(t_j) - G(t_{j-1})}\, \epsilon_{j,n}, \quad n \in \{1, 2, \cdots, N\},$$

where $\epsilon_{j,n} \sim \mathcal{N}(0,1)$. Therefore, we have

$$X(t_k) = \big(G(t_k) - t_k\big)\beta + diag(\gamma) \sum_{j=1}^{k} \sqrt{G(t_j) - G(t_{j-1})}\, L_\Sigma \epsilon_j,$$

where $\epsilon_j = (\epsilon_{j,1}, \epsilon_{j,2}, \cdots, \epsilon_{j,N})^T$, $\epsilon_{j,n} \sim \mathcal{N}(0,1)$, and $\epsilon_{j,m}$ is independent of $\epsilon_{j,n}$ for all $m, n \in \{1, 2, \cdots, N\}$, and $j \in \{1, 2, \cdots, M\}$.

Finally, the sample paths of $Z \sim fGH_N(H, \lambda, \alpha, \beta, \theta, \Sigma)$ is generated as follows:

$$Z(t_k) = \sum_{j=0}^{k-1} K_H(t_k, t_j)\big(X(t_{j+1}) - X(t_j)\big), \quad k \in \{1, 2, \cdots, M\}.$$

Figure 1 presents sample paths of the generalize inverse Gaussian subordinator $G(t)$ with parameters $\lambda = -1.2$, $\delta = 0.1$, and $\gamma = 0.01$ as well as of the univariate fractional generalized hyperbolic process with parameters $\lambda = -1.2$, $\delta = 0.1$, $\beta = -0.05$, $\theta = 0.1$, and $H = 0.65$. Figure 2 illustrates a pair of sample path of the two dimensional fractional generalized hyperbolic process $Z = (Z_1(t), Z_2(t))$ for $t \geq 0$ with parameters.

4 ARMA-GARCH Model with fGH Innovations

Let $Z \sim fGH_N(H, \lambda, \alpha, \beta, \theta, \Sigma)$ generated by $X \sim GH_N(\lambda, \alpha, \beta, \theta, \Sigma)$. A N-dimensional discrete time process $y = \{y(t_k)\}_{k\in\{0,1,2,\cdots\}}$ with $y(t_k) = (y_1(t_k), y_2(t_k), \cdots, y_N(t_k))$ is referred to as the N-dimensional ARMA-GARCH model with fGH innovations when it is given by the ARMA(1,1)-GARCH(1,1) model as follows: $y_n(t_0) = 0$ and $\varepsilon_n(t_0) = 0$, and

$$\begin{cases} y_n(t_{k+1}) = \mu_n + a_n y_n(t_k) + b_n \sigma_n(t_k)\varepsilon_n(t_k) + \sigma_n(t_{k+1})\varepsilon_n(t_{k+1}), \\ \sigma_n^2(t_{k+1}) = \omega_n + \xi_n \sigma_n^2(t_k)\varepsilon_n^2(t_k) + \zeta_n \sigma_n^2(t_k) \end{cases}$$

where $\varepsilon_n(t_{k+1}) = Z_n(t_{k+1}) - Z_n(t_k)$ and $n \in \{1, 2, \cdots, N\}$. This model describes volatility clustering effect by GARCH(1, 1) model, the fat-tails and the asymmetric dependence between elements by the generalize hyperbolic process X, and the long-range dependence by fractional generalized hyperbolic process Z.

Since we have

$$Z_n(t_k) \approx \sum_{j=0}^{k-1} K_H(t_k, t_j)(X_n(t_{j+1}) - X_n(t_j)),$$

the increment $Z_n(t_{k+1}) - Z_n(t_k)$ can be approximated as follows:

$$\begin{aligned} Z_n(t_{k+1}) - Z_n(t_k) &\approx K_H(t_{k+1}, t_k)(X_n(t_{k+1}) - X_n(t_k)) \\ &\quad + \sum_{j=0}^{k-1}(K_H(t_{k+1}, t_j) - K_H(t_k, t_j))(X_n(t_{j+1}) - X_n(t_j)). \end{aligned}$$

Let M be the number of time steps in the sample and N be the number of assets in the portfolio. We estimate the parameters of the models as follows:

1) Estimate ARMA(1,1)-GARCH(1,1) parameters μ_n, a_n, b_n, ω_n, ξ_n, and ζ_n with standard normal innovations by maximum likelihood estimation (MLE) with assumption $\sigma_n^2(t_0) = \frac{\kappa_n}{(1-\xi_n-\zeta_n)}$ for $n = 1, 2, \cdots, N$.

2) Using the estimated parameters, extract residuals $\varepsilon_n(t_k)$ for $n = 1, 2, \cdots, N$ and $k = 1, 2, \cdots, M$.

3) Estimate the Hurst index H_n of $\{\varepsilon_n(t_k)\}_{k=1,2,\cdots,M}$ using rescaled range (R/S) analysis (Hurst, 1951; Lo, 1991; Qian and Rasheed, 2004). Then, the parameter H is obtained as the mean of H_n for $n = 1, 2, \cdots, N$.

4) Let $Z_n(t_k) = \sum_{j=1}^{k} \varepsilon_n(t_j)$, and extract $\{X_n(t_k)\}_{k=1,2,\cdots,M}$ for $n = 1, 2, \cdots, N$ as follows:

$$X_n(t_1) = \frac{Z_n(t_1)}{K_H(t_1, t_0)} \quad \text{and}$$

$$X_n(t_k) = X_n(t_{k-1}) + \frac{Z_n(t_k) - Z_n(t_{k-1})}{K_H(t_k, t_{k-1})}$$

$$- \sum_{j=0}^{k-2} \frac{K_H(t_k, t_j) - K_H(t_{k-1}, t_j)}{K_H(t_k, t_{k-1})} \big(X_n(t_{j+1}) - X_n(t_j)\big) \quad \text{for } k = 2, 3, \cdots, M. \tag{8}$$

5) Estimate the parameters λ_n, α_n, β_n, and θ_n of the generalized hyperbolic process using $\{X_n(t_k)\}_{k=1,2,\cdots,M}$ extracted in the step 4) for $n = 1, 2, \cdots, N$.

6) Setting $\lambda = \sum_{n=1}^{N} \frac{\lambda_n}{N}$ and $\alpha = \sum_{n=1}^{N} \frac{\alpha_n}{N}$, estimate the parameters β_n and θ_n again using $\{X_n(t_k)\}_{k=1,2,\cdots,M}$ by means of maximum likelihood estimation (MLE) for $n = 1, 2, \cdots, N$.

7) From the data $\{(X_m(t_k),\ X_n(t_k)\}_{k=1,2,\cdots,M}$ extracted in the step 4), calculate the covariance between $X_m(t_1)$ and $X_n(t_1)$ for $m, n \in \{1, 2, \cdots, N\}$. Estimate $\Sigma = [\sigma_{m,n}]_{m,n\in\{1,2,\cdots,N\}}$ by Equation (4) and $\mathrm{cov}(X_m(t_1),\ X_n(t_1))$.

To estimate the parameters and covariance matrix discussed above, $2,730$ observed 1-minute stock prices for IBM Co., Johnson & Johnson, Oracle Co., Apple Inc., Amazon.com, Inc., and CVS Health Co. from February 5 to February 13, 2020 are obtained [6]. The estimated ARMA(1,1)-GARCH(1,1) parameters μ_n, a_n, b_n, ω_n, ξ_n, and ζ_n with standard normal innovations are presented in Table 1. The residuals obtained from estimated parameters are used to compute Hurst index H_n for $n = 1, 2, \cdots, N$, which are reported in Table 2 with the estimated $H = 0.5387$ as the mean of H_n. The estimated

[6] Since the New York Stock Exchange (NYSE) has normal trading hours from 9:30 a.m. to 4:00 p.m., one day is set to 390 minutes, meaning $dt = 1/390$.

fractional generalized hyperbolic parameters H, λ, α, β, and θ are reported in Table 3 with the estimated non-fractional generalized hyperbolic parameters. Note that the ARMA-GARCH model with fractional generalized hyperbolic innovations becomes the ARMA-GARCH model with non-fractional generalized hyperbolic innovations when the parameter $H = 1/2$. The estimated matrix Σ is given in Table 4.

For the goodness-of-fit test, the Kolmogorov-Smirnov (hereafter KS) test is performed given the statistic

$$KS = \sum_{x} |\hat{F}(x) - F(x)|,$$

where $\hat{F}(x)$ and $F(x)$ are the empirical sample distribution and the estimated theoretical distribution, respectively. Table 5 presents the p-values of KS statistic [7]. The KS statistics are calculated for fractional generalized hyperbolic distribution with estimated parameters $(\lambda,\ \alpha,\ \beta_n,\ \theta_n)$ as well as the empirical sample distribution of $\{X_n(t_k) - X_n(t_{k-1})\}$ for $k = 1, 2, \cdots, M$, where $X_n(t_k)$ is the extracted process by Equation (8).

The ARMA-GARCH model with fractional generalized hyperbolic innovations is not rejected by KS statistics at 10% significance level for the all six stock returns, which means the empirical sample distribution is not statistically different from the estimated theoretical distribution. However, the ARMA-GARCH models with non-fractional and normal innovations are rejected at 10% significance level for all considered stocks. Consequently, these results suggest that the ARMA-GARCH model with fractional generalized hyperbolic innovations can be used as an approximation to the empirical sample distribution. Figure 3 exhibits the distributions from the goodness-of-fit tests for each stock. Therefore, it is noted that the ARMA-GARCH model with fractional generalized hyperbolic innovations better describes the behavior of the high frequency stock returns considered in this study than the ARMA-GARCH models with non-fractional generalized hyperbolic and normal innovations do. In this regard, portfolio VaR and AVaR based on the ARMA-GARCH models with fractional generalized hyperbolic innovations can be applied to the portfolio optimization. As alternative risk measures, the VaR and AVaR can overcome the limitations of the use of portfolio variance for a measure of risk. In portfolio optimization that portfolio managers and investors use for portfolio rebalancing, a crucial measure is the marginal risk contribution

[7]Refer to Marsaglia et al. (2003); Marsaglia and Marsaglia (2004) for calculating p-values of KS statistic.

to the portfolio (Gourieroux et al., 2000), which is the risk measure with respect to a given portfolio holding. Hence, using VaR and AVaR calculated by the ARMA-GARCH model with fractional generalized hyperbolic innovations, we can find the optimal portfolio. Moreover, we obtain encouraging results from the goodness-of-fit test that it can be applied to option pricing model equipped with volatility clustering, the leverage effect and the conditional skewness, leptokurtosis, and long-range dependence.

5 Conclusion

In this study, the non-fractional generalized hyperbolic process is derived by subordinating time-changed Brownian motion to generalized inverse Gaussian process, and the fractional generalized hyperbolic process is obtained using Voltera kernel. Then, introduced is the multivariate ARMA-GARCH model with fractional generalized hyperbolic innovations which exhibits three-stylized facts: fat-tails, volatility clustering, and long-range dependence property. Such a model is compared with two ARMA-GARCH models with non-fractional generalized hyperbolic and normal innovations. It is noted that the fractional generalized hyperbolic process has better performance in describing the behavior of the residual process of high frequency returns than the non-fractional generalized hyperbolic process or Gaussian process.

Table 1: Estimated Parameters of ARMA-GARCH Models with Standard Normal Innovations

	IBM	**Johnson & Johnson**	**Oracle**	**Apple**	**Amazon**	**CVS**
ARMA(1, 1)						
a_n	0.6681	-0.2489	0.5850	0.3375	-0.4656	0.9043
b_n	-0.6311	0.2372	-0.6356	-0.4119	0.4555	-0.9100
μ_n	$0.2710 \cdot 10^{-4}$	$0.1092 \cdot 10^{-4}$	$0.1294 \cdot 10^{-4}$	$-0.8574 \cdot 10^{-7}$	$0.1057 \cdot 10^{-4}$	$-0.1116 \cdot 10^{-5}$
GARCH(1, 1)						
ζ_n	0.7883	0.8958	0.9111	0.9009	0.8992	0.8853
ξ_n	0.1986	0.0784	0.0666	0.0593	0.0747	0.0974
ω_n	$0.1180 \cdot 10^{-7}$	$0.2940 \cdot 10^{-8}$	$0.8443 \cdot 10^{-8}$	$0.5477 \cdot 10^{-9}$	$0.1125 \cdot 10^{-7}$	$0.7397 \cdot 10^{-8}$

Table 2: Estimated Hurst Index H_n

IBM	$H_1 = 0.5547$
Johnson & Jonhson	$H_2 = 0.5424$
Oracle	$H_3 = 0.5116$
Apple	$H_4 = 0.5163$
Amazon	$H_5 = 0.5558$
CVS	$H_6 = 0.5513$
Mean	$H = 0.5387$

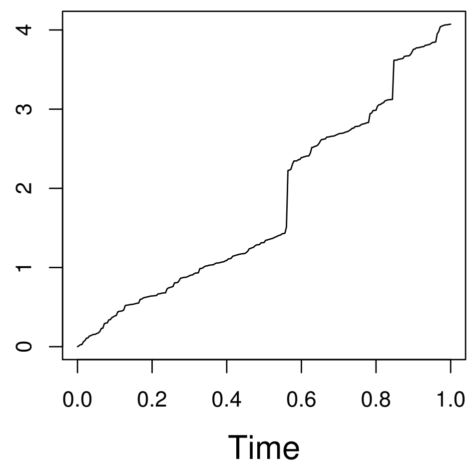
Table 3: Estimated Parameters of Non-fractional GH and Fractional GH Process

	IBM	Johnson & Johnson	Oracle	Apple	Amazon	CVS
Non-Fractional GH, $\boldsymbol{\lambda = -1.3926}$, $\boldsymbol{\alpha = 0.0745}$						
β	$0.8494 \cdot 10^{-8}$	$-0.1234 \cdot 10^{-4}$	$-0.6355 \cdot 10^{-5}$	$-0.3409 \cdot 10^{-4}$	$-0.1549 \cdot 10^{-4}$	$0.8009 \cdot 10^{-5}$
θ	$0.6428 \cdot 10^{-3}$	$0.3622 \cdot 10^{-3}$	$0.4391 \cdot 10^{-3}$	$0.6172 \cdot 10^{-3}$	$0.7846 \cdot 10^{-3}$	$0.7898 \cdot 10^{-3}$
Fractional GH, $\boldsymbol{H = 0.5387}$, $\boldsymbol{\lambda = -1.3965}$, $\boldsymbol{\alpha = 0.0561}$						
β	$-0.4953 \cdot 10^{-5}$	$-0.1309 \cdot 10^{-4}$	$-0.8864 \cdot 10^{-5}$	$-0.3555 \cdot 10^{-4}$	$-0.2430 \cdot 10^{-4}$	$0.3158 \cdot 10^{-5}$
θ	$0.7845 \cdot 10^{-3}$	$0.4430 \cdot 10^{-3}$	$0.5360 \cdot 10^{-3}$	$0.7546 \cdot 10^{-3}$	$0.9599 \cdot 10^{-3}$	$0.9675 \cdot 10^{-3}$

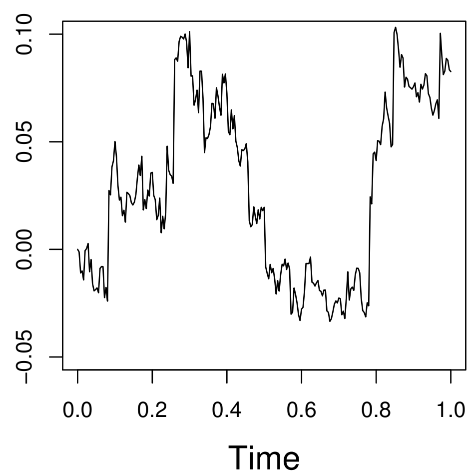
Table 4: Estimated $\boldsymbol{\Sigma = [\sigma_{m,n}]_{m,n\in\{1,2,\cdots,N\}}}$

	IBM	Johnson & Johnson	Oracle	Apple	Amazon	CVS
IBM	1					
Johnson & Jonhson	0.3592	1				
Oracle	0.7235	0.2764	1			
Apple	0.7071	0.4618	0.7936	1		
Amazon	0.3144	0.1423	0.4652	0.6337	1	
CVS	0.2022	0.4618	0.2745	0.2239	0.1181	1

Figure 1: Simulated sample paths

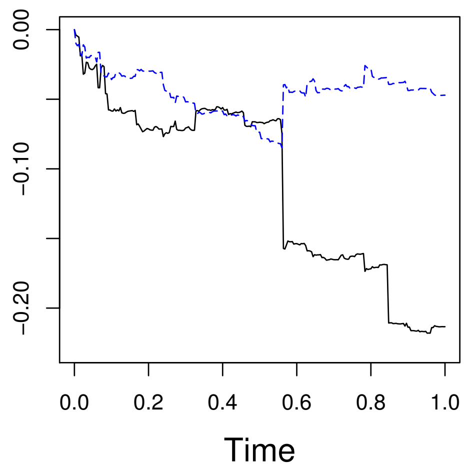


(a) Simulated sample path of the generalized inverse Gaussian subordinator G with parameters $\lambda = -1.2$, $\delta = 0.1$, and $\gamma = 0.01$

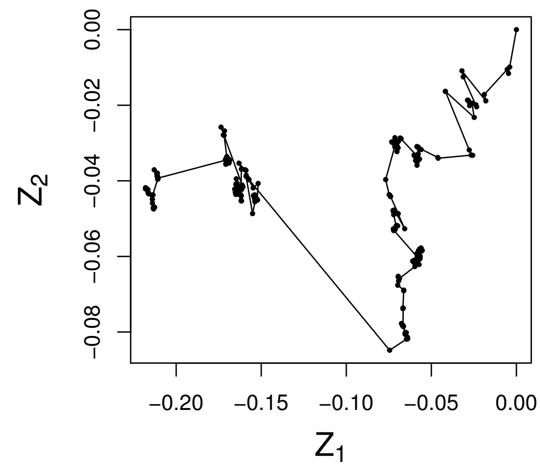


(b) Simulated sample path of the univariate fractional generalized hyperbolic process Z with parameters $\lambda = -1.2$, $\delta = 0.1$, $\gamma = 0.01$, $\beta = -0.05$, $\theta = 0.1$, and $H = 0.65$

Figure 2: Simulated sample paths of the two dimensional fractional generalized hyperbolic process $Z = (Z_1(t),\ Z_2(t))_{t\geq 0}$ **with parameters** $\lambda = -1.2$, $\delta = 0.1$, $\gamma = 0.01$, $\beta = (-0.02,\ -0.05)$, $\theta = (0.15,\ 0.06)$, $\sigma_{1,2} = \sigma_{2,1} = 0.75$, **and** $H = 0.65$



(a)

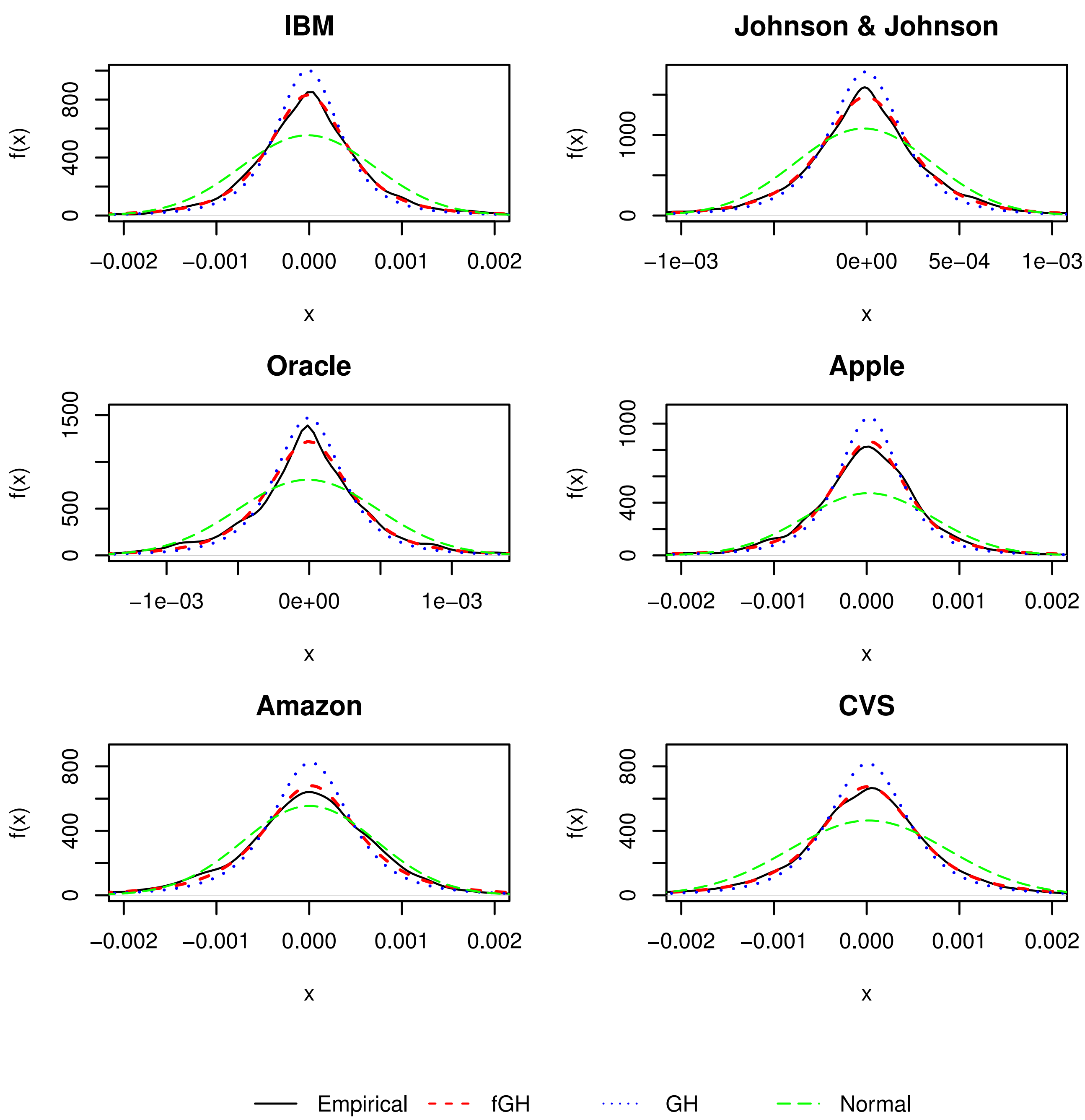


(b)

Table 5: Goodness-of-fit Test for ARMA-GARCH Models

	IBM	Johnson & Johnson	Oracle	Apple	Amazon	CVS
ARMA-GARCH MODEL WITH FRACTIONAL GH INNOVATIONS						
KS	0.0758	0.0670	0.1042	0.1207	0.0795	0.0630
(p-value)	(0.8432)	(0.6967)	(0.6776)	(0.3669)	(0.7269)	(0.9627)
ARMA-GARCH MODEL WITH NON-FRACTIONAL GH INNOVATIONS						
KS	0.1990	0.1789	0.2299	0.1560	0.1967	0.1410
(p-value)	(0.0007)	(0.0000)	(0.0002)	(0.0646)	(0.0017)	(0.0899)
ARMA-GARCH MODEL WITH NORMAL INNOVATIONS						
KS	0.1542	0.4748	0.3089	0.1763	0.1391	0.2047
(p-value)	(0.0168)	(0.0000)	(0.0000)	(0.0383)	(0.0815)	(0.0098)

Figure 3: Goodness-of-fit Test



Abbreviations

GH Generalized hyperbolic

GIG Generalized inverse Gaussian

B Brownian motion

FARIMA Fractionally differenced autoregressive integrated moving average

Y_λ Modified Bessel function of the second kind with index λ

fGH Fractional generalized hyperbolic

KS Kolmogorov-Smirnov

$\stackrel{d}{=}$ Equal in distribution

$\wedge$ Minimum

$\vee$ Maximum

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AUDIT CONCERNS AND ADJUSTMENTS NEEDED TO ADDRESS REVERSE FACTORING

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ABSTRACT

The purpose of this paper is to address reverse factoring (RF), as recently posed by the Big 4 and Moody's Investor Services to the Financial Accounting Standards Board and the International Accounting Standards Board, respectively. RF is a supply chain financing technique designed to maximize working capital by leveraging the buyer's relationship with a third-party funding mechanism. With RF, the buyer establishes an arrangement with a financial intermediary (FI) whereby the buyer's suppliers gain attractive funding based on the buyer's creditworthiness. This paper highlights the issues related to RF and suggests financial statement disclosures, as well as additions to audit programs. The use of RF, a supply chain financing tool, is widely believed to be accelerating rapidly, with current U.S. transactions estimated to be well above $300 billion. Extant accounting guidance for RF has come under intense scrutiny for lack of transparency by investment rating agencies, the Securities and Exchange Commission (SEC), and the Big 4. The specific concern by the SEC and rating agencies is that current RF accounting appears to hide short-term debt in Trades Payables accounts, with a corresponding distortion in the Statement of Cash Flows. Major audit firms are concerned that the lack of U.S. GAAP guidance leads to limited disclosure of RF in practice, elevating litigation risk for auditors if hidden debt leads to the unforeseen collapse of companies with weaker-than-understood cash positions.

INTRODUCTION

Reverse factoring (RF) is a supply chain financing technique designed to maximize working capital by leveraging the buyer's relationship with a third-party funding mechanism. With RF, the buyer establishes an arrangement with a financial intermediary (FI) whereby the buyer's suppliers gain attractive funding based on the buyer's creditworthiness. Typically, the supplier is paid by the FI earlier than the payment terms, and at a discount, while the buyer receives an extended payment date (in some cases by more than 120 days) from the FI. Typically, the bank or other FI funds the program and receives a fee. Third parties, such as Taulia, Oracle, and C2FO are also well-known suppliers of supply chain financing and RF services.

The use of RF is widely believed to be accelerating. A PwC (2019) study indicates 49 percent of organizational leaders report using RF arrangements with 37 percent more considering their use. Techniques to stretch the payment cycle (such as RF) have grown markedly during the COVID-19 pandemic while other forms of short-term financing faltered. Steinberg (2020) reported that banks generated $12.7 billion in the first half of 2020 from supply-chain finance, up 3.6 percent from a year earlier even as revenue fell 29 percent for commodities trade finance. Fitch Ratings (2018) suggests that RF activity may account for a $327 billion increase in payables financing over the 2014-2017 time frame, or about $1 billion per company.[1] The Aite Group reports a similar estimate ($350 billion) of invoices currently associated with RF (Steinberg 2020).

[1] Fitch's assessment is based on its analysis of 337 companies showing "days payables outstanding" (DPO) had grown by 17 percent between 2014 and 2017 and, in 2017 alone, had risen 6 percent to a 96-day norm. Fitch recognized that supply chain financing is not

The expanding use of RF has necessitated a careful examination of accounting practices. Specifically, the Big 4 (2019) requested that the Financial Accounting Standards Board (FASB) provide guidance on RFs. In addition, the International Financial Reporting Standards Interpretations Committee (IFRS IC) also received requests to improve RF accounting standards (Moody's 2020, PYMNTS 2019, Fitch 2018, and Scaggs 2019). The request express concern that a lack of clear regulatory guidance is resulting in RF purchase obligations being inappropriately included (i.e., hidden) in Trade Payables. It is argued, that these "trade payables" should be included in short-term debt as opposed to trades payable. The inclusion of RF amounts in trades payable excludes RF from key leverage and debt ratios and affects loan capacity, loan covenants, efficiency measures (e.g., cash flow from operating activities to sales) and potentially, market valuation (Gallo 2015; Kurtz 2015; White 2020). Further, a curtailment or cessation of RF availability may create a liquidity crisis that could lead to an immediate and material working capital outflow. The recent and widely publicized failure of Greensill, a popular provider of RF services, highlights the risks to buyers engaging in RF activity (Nelson et al. 2021). Absent adequate disclosure, investors cannot ascertain the sustainability of RF as a source of working capital. In addition, auditors are left to evaluate trades payable to identify whether the trade payables include amounts that should appear in short-term (non-traded payable) debt (aka debt).

The purpose of this paper is three-fold. First, the paper discusses how auditors can identify RF activity. Second, the paper evaluates the features of RF activity that support categorization as either debt or payable. Third, suggestions to financial reporting disclosures and the audit program that should be considered are provided. Throughout the paper, we reference current examples of disclosures by companies known to be engaged in RF activity.

ACCOUNTING AND AUDITOR CONCERNS

The basic accounting challenge for RF activity is both straightforward and complex, affecting both the balance sheet and Statement of Cash Flows. Specifically, (a) should the liability for goods and services purchased from a supplier in the ordinary course of business and initially paid by an FI in an RF arrangement be shown as a "Trade Payables" or "Short-Term Debt?" (b) are the transactions to be classified in the Statement of Cash Flows as an operating activity (CFOA), cash flow from financing activities (CFF), noncash financing activities, or some combination? A complicating factor is that RF can be structured in a multitude of ways, altering the balance of benefits between buyer and supplier, creating uncertainty about the appropriate accounting treatment. Such factors include, but are not limited to, changes in the nature, amount, or timing of the original terms, incentives to the buyer, or an increase in the product cost that could be interpreted as an interest element.

The perceived problems associated with RF reporting and disclosure is motivating responses from the SEC, FASB, IFRS IC, and auditing firms. In 2019, the SEC sent comment letters, primarily based on unusually high days payable outstanding metrics, to inquire about the use of RF to Masco Corporation, Boeing Company, and Coca-Cola Company (Steinberg 2020) as well as Graphic Packaging Holding Company and Proctor & Gamble (Usvyatsky 2020). In an unusual move, signatories from each of the "Big Four" audit firms joined to draft an open letter to FASB in late 2019 that requested improved guidance and proposed alternative solutions to the challenge (Big Four 2019). The FASB Board Meeting included "supply chain financing" on its agenda, with a focus on RF, in June, 2021 and a later FASB/IASB meeting in July, 2021. These meeting focused on staff research and scoping language for further investigations and comments from practice.

the sole cause but warned that recent audit failures suggest that RF "could have a potentially large impact on vulnerability to default for specific issuers, making awareness critical."

Regulators and financial statement analysts are not alone in their angst over RF accounting guidance. As previously noted, major audit firms are concerned that weaknesses in U.S. GAAP have led to "limited disclosure of [RF] in practice" which may elevate litigation risk for auditors (Big Four 2019). Without reporting and disclosure guidance, clients may hide debt, potentially leading to unforeseen collapses by companies in weaker-than-understood cash positions. In part, the limited disclosure can be attributed to the auditor's inability to clearly identify RF activity in the audit client.

IDENTIFYING RF ACTIVITY

There are numerous ways in which the auditor can identify RF activity. The first and most obvious method is client inquiry. Aside from that step, indications of RF arrangements might be found in the liquidity, capital resources and financial position discussion found in MD&A section of the SEC 10-K. Notwithstanding client responses, an auditor should compare the client's supply chain activity to market norms. In the traditional model of buyer-supplier transactions, buyers order from suppliers based on agreed-upon credit terms. Suppliers then send the goods to the buyer and invoice them according to the agreed-upon credit terms. Typical credit terms will vary by industry, but normally hover between "2/10, net 30" and "net 45", yielding a "days payable outstanding" (DPO) metric between 30 to 45 days. Thus, auditors can most easily identify unusual financing arrangements by comparing client DPO with the industry norms. Table 1 presents 2010 and 2020 DPO statistics for large companies known to engage in reverse factoring. As shown in the Table, the average (median) DPO in 2020 for this RF-using group is 111.1 (83.3), a figure markedly higher than market norms of 55 days (Hackett Group 2021) or more recent evidence from U.K. companies of 52 days for RF users and 38 days by companies not using RF (Chuk, Lourie, and Yoo 2021).

TABLE 1. DPO OF COMPANIES KNOWN TO ENGAGE RF, 2010 & 2020

Company Name	2010	2020	Change	% Increase
Astra-Zeneca	130.6	142.0	11.4	9%
Boeing	52.1	81.5	29.3	56%
Coca Cola	47.4	99.5	52.1	110%
Ford Motor	53.6	69.4	15.8	30%
General Electric	87.0	97.9	10.9	13%
Graphic Packaging	37.7	51.5	13.8	37%
Keurig Dr Pepper	44.8	245.9	201.2	450%
Macy's	33.9	54.4	20.5	60%
Masco	37.4	63.1	25.6	68%
Mondelez	53.5	136.3	82.8	155%
Nissan	55.7	76.6	20.9	38%
P&G	63.7	120.8	57.1	90%
Parker Hannifan	35.8	44.8	9.0	25%
Pfizer	94.1	172.1	78.0	83%
Spectrum Brands	57.7	71.7	14.0	24%
Tupperware	70.0	83.3	13.3	19%
Vodafone	180.0	278.3	98.3	55%
Average	66.8	111.1	44.4	77.6%
Median	53.6	83.3	20.9	54.6%
Std. Dev	38.3	66.8	49.4	103.2%

There are two other points of interest in Table 1 that may inform the auditor of the client's working capital risk appetite. First, it is noteworthy that these large RF-using companies had relatively high average (median) DPO figure even in 2010 (66.8 and 53.6, respectively), though how this was accomplished can only be speculated upon. Second, all of the firms have increased their DPO metric over the past ten years, increasing by an average (median) of 44.4 (20.9) days. Unusually large or significant changes in DPO and payables balances attract the attention of regulators. The SEC asked Coca-Cola in June of 2020 to "consider disclosing and discussing changes in your accounts payable days outstanding to provide investors with a metric of how supply chain finance arrangements impact your working capital." Of course, large absolute or percentage changes in accounts (trades) AP balances may likewise flag RF activity or at least gain the attention of regulators.

The second approach to identifying RF activity is to compare supplier invoice terms to industry norms. Coca Cola's 2020 footnote disclosure asserted that the majority of their suppliers operate under "net 120" terms. Keurig Doctor Pepper (KDP), by contrast, opaquely disclosed that, "Excluding our suppliers who require cash at date of purchase or sale, our current payment terms with our suppliers generally range from 10 to 360 days." However, not all RF activity can be conveniently found by invoice terms (or at least by comparing them between suppliers). P&G, in describing its supply chain financing (SCF) activities, stated that

> *The terms of the Company's payment obligation are not impacted by a supplier's participation in the SCF. Our payment terms with our suppliers for similar materials within individual markets are consistent between suppliers that elect to participate in the SCF and those that do not participate. Accordingly, our average days outstanding are not significantly impacted by the portion of suppliers or related input costs that are included in the SCF.*

A third approach to identifying RF activity is to examine payments to suppliers. Specifically, if invoice payments to suppliers are directed to a financial intermediary (as is common practice in RF settings), you should request further information about buyer-supplier payment processes.

In general, changes in trades payables appear in the operating activities section of the statement of cash flows; whereas changes in short-term debt appear as a financing activity. As such, the proper classification of the RF is critical to the placement of the related changes in account balances on the Statement of Cash Flows.

TRADE PAYABLE OR DEBT?

When a client is involved with RF, the auditor must assess whether the client has appropriately accounted for and met disclosure requirements. As noted, the key question is whether RF-supported purchases should be accounted as trades payables or a short-term (debt) obligations. The answer to the trades payable/short-term debt question determines the appropriate reporting and disclosures.

The proper categorization of RF activity presumes clear criteria by which one can separate activity into an appropriate account bucket. Unfortunately, accounting standards do not provide clear definitions to support evaluation. Specifically, the Codification uses the account title Trades (Accounts) Payable but is void of a definition for the account title. A generally accepted definition of a trades payable is a non-interest bearing, supplier-financed purchase in the normal course of business. IFRS defines a trades payable as "liabilities to pay for goods or services that have been received or supplied and have been invoiced or formally agreed with the supplier" (IAS 37). It is generally accepted that trades (accounts) payable are due within 30-60 days. By contrast the FASB Codification identifies short-term obligations as debts due to be paid within one year after the balance sheet date or the operating cycle, whichever is longer. (FASB ACS210-10-20). The imprecise nature of the definitions of debt and trade payable undermine a robust categorization of RF activity.

The FASB, in two of their recent meetings (June 20, and July 23, 2021) about RF, highlight the lack of a GAAP definition for trades payable and refer instead to SEC staff comments made at AICPA conferences. The comments infuse some granularity into account definitions (Comerford, 2003 and 2004) which reference *SEC Regulation S-X Article 5* (1940). This regulation requires the financial statement issuer to separately state on the face of the balance sheet amounts due to *financial institutions* and amounts due to *trade creditors*. The SEC subsequently provided a more clear-cut definition by stating the belief that "a trade creditor is a *supplier* that has provided an entity with goods and services in advance of payment" (Comerford, 2004). Defining trade payable in this manner, without further clarification, would appear to render any transaction supported by an FI as debt.

ARRANGEMENTS THAT SUGGEST DEBT

Notwithstanding limitation of account definition, auditors must serve as arbiters of appropriate accounting for RF arrangements. Most client organizations with RF arrangements have a strong preference for classification as trades payable (Sawers 2016). To achieve their goal, organizations carefully consider and try to avoid those program characteristics or changes to the program that suggest categorization as debt (see Table 2). Specifically, characteristics suggests categorization as debt when the substance of the transaction changes from a traditional trades payable, such that the original trades payable, in substance, become debt. Basic characteristics or changes might include the following:

- modifications to the terms of the original agreement with the supplier,
- changes of the rights of the FI toward the buyer,
- the buyer incurs financing costs or agrees to cover any of the supplier's costs of the arrangement,
- suppliers are required to participate in the program and/or the buyer has control over the relationship between the supplier and the FI,
- the buyer receives kickbacks from the FI or otherwise profits from the RF arrangement

While there is no current authority to state that any one feature is determinative of proper categorization, certain assumptions might be made. For example, a strong presumption of debt would be justified in situations where the buyer pays interest to the financial intermediary.

STEPS TO CHARACTERIZE RF AS TRADE PAYABLE

To avoid a debt characterization, organizations structure RF agreements in a very legalistic fashion. Coca-Cola and Masco both presents comprehensive disclosures in their 2020 10K filings (see Appendix). In general, both disclosures contain basic descriptions of their respective programs and include items such as:

- Supplier and Buyer agree to the basic and customary trade terms and how the original terms (e.g. due date, amount) of the obligation to the supplier remain the same.
- Buyer is independent of the agreement between the financial institution and the supplier.
- financial institution and the supplier set the terms by which the supplier sells obligations to the financial institution, as adjusted to reflect credit-worthiness of Buyer
- Supplier voluntarily (not mandated) participates in the RF arrangement.
- Buyer organization has no economic interest in the supplier's decision to participate in an RF arrangement with the financial institution.

TABLE 2: RF FEATURES THAT SUGGEST CLASSIFICATION AS SHORT-TERM DEBT

Modification to Original Agreement	**Specification of FI Rights**
Change in the nature, amount, and/or timing of the original terms [1]	Bank's right to require immediate payment of all payables paid [8]
Original obligation substantially modified [1, 2, 8]	Credit enhancements such as collateral [8]
Legal change that requires extinguishment of one debt and the creation of another debt [9]	Bank's right to obtain payment from the company's other accounts [8]
Extended due date (maybe extension that is not typical for the company and/or the industry) [3, 7, 8, 9]	Other rights obtained by the bank that are not typical of trade payables [8]
	Line of Credit/Financing Costs
An interest element (which is not typical of trade payables) [8]	An increase in the product cost that could be interpreted as an interest element [8]
Delegation of Rights and Transaction "Substance"	
Existence of promissory note [3]	Buyer agrees to cover supplier's finance fee or other costs [2]
Derecognize and establish new debt [3]	Arrangement draws on the Buyer's line of credit [8]
Economic substance [1, 3, 5, 6, 8]	**Supplier Issues**
Additional right atypical to the industry [8]	Nontypical commitment to the supplier [8]
Buyer Benefit	Supplier-specific payment terms that suggest a reliance on bank funding [8]
Profit sharing such that the company receives part of the discount earned by the FI [8]	Mandatory supplier participation[2]
Buyer receives direct economic benefit (e.g., rebate, kickback) [1, 3, 4]	Buyer has excessive negotiating power between the supplier and intermediary [2]

[1] Big Four (2019); [2] Capretta (2015); [3] Comerford (2003); [4] Comerford (2004); [5] Deloitte (2017); [6] Feenstra et al. (2017); [7] SEC Reg S-X (1940); [8] Vanderpool et al. (2017); [9] White (2020)

Insight is gleaned from other organizations presenting RF activity (see Table 3). However, there are no specific regulatory disclosure requirements at present. Yet, the most salient disclosures to date address four issues regarding the scope and potential risk of the arrangements. In particular, these disclosures relate to: (1) the dollar amount of Buyer obligations available to be sold by suppliers to the FI, (2) the dollar amount of Buyer obligations actually sold by suppliers to the FI, (3) the percentage of suppliers that participate in the program, and (d) a discussion of any potential impact on liquidity in the event of a termination of the program. The latter point is exemplified in the recent Boeing disclosure:

> *While access to supply chain financing has been reduced due to our [Boeing] current credit ratings and debt levels, we do not believe that these or future changes in the availability of supply chain financing will have a significant impact on our liquidity. Supply chain financing is not material to our overall liquidity. (emphasis added)*

Similarly, Masco's 2020 disclosure stated:

> *A downgrade in our [Masco] credit rating or changes in the financial markets could limit the financial institutions' willingness to commit funds to, and participate in, the program. We do not believe such risk would have a material impact on our working capital or cash flows, as substantially all of our payments are made outside of the program. (emphasis added)*

Ford Motor Company disclosed:

> *Our [Ford] suppliers' voluntary inclusion of invoices in the SCF program has no bearing on our payment terms, the amounts we pay, or our liquidity. (emphasis added)*

Client organizations and their auditors can consider additional commentary for the benefit of stakeholders. For example, in 2019 P&G discussed projected trends and uncertainties associated with extended payment terms that might materially impact future liquidity as follows:

> *Although difficult to project due to market and other dynamics, we [P&G] anticipate incremental cash flow benefits from extended payment terms with suppliers could decline in fiscal 2020.* (emphasis added)

TABLE 3. RF CHARACTERISTICS AND RELATED DISCLOSURES, 2020

RF Characteristic	**Example Disclosures in 2020**
The Supplier and Buyer agree to the basic and customary trade terms; Original terms (e.g. due date, amount) of the obligation to the supplier remain the same.	P&G "However, all the Company's payments to participating suppliers are paid to the SCF Bank on the invoice due date, regardless of whether the individual invoice is sold by the supplier to the SCF Bank. The SCF Bank pays the supplier on the invoice due date for any invoices that were not previously sold by the supplier to the SCF Bank. *The terms of the Company's payment obligation are not impacted by a supplier's participation in the SCF*." Ford Motor "Our suppliers' voluntary inclusion of invoices in the SCF program has no bearing on our payment terms, the amounts we pay, or our liquidity."
The Buyer is independent of the agreement between the financial institution and the supplier.	Masco "A third party administers the program; our responsibility is limited to making payment on the terms originally negotiated with our supplier, regardless of whether the supplier sells its receivable to a financial institution."

TABLE 3 (continued). RF CHARACTERISTICS AND RELATED DISCLOSURES, 2020

RF Characteristic	Example Disclosures in 2020
The financial institution and the supplier set the terms by which the supplier sells obligations to the financial institution, as adjusted to reflect Buyer credit-worthiness	<u>Coca Cola</u> "Additionally, two global financial institutions offer a voluntary supply chain finance ("SCF") program which enables our suppliers, at their sole discretion, to sell their receivables from the Company to these financial institutions on a non-recourse basis *at a rate that leverages our credit rating and thus may be more beneficial to them.*"
Supplier voluntarily (not mandated) participates in the RF arrangement.	<u>Coca Cola</u> "Then, if they are participating in the SCF program, our suppliers, *at their sole discretion*, determine which invoices, if any, they want to sell to the financial institutions. Our *suppliers' voluntary inclusion* of invoices in the SCF program has no bearing on our payment terms." <u>P&G</u> "Under the SCF, qualifying suppliers *may elect to sell* their receivables from the Company to an SCF Bank." <u>Astra Zeneca</u> "…due to suppliers *that have signed up* to a supply chain financing programme, under which the suppliers can *elect on an invoice-by-invoice basis* to receive a discounted early payment from the partner bank rather than being paid in line with the agreed payment terms."
The Buyer organization should have no economic interest in the supplier's decision to participate in an RF arrangement with the financial institution.	<u>Ford Motor</u> "We have no economic interest in a supplier's decision to participate in the SCF program." <u>P&G</u> "The Company has no economic interest in a supplier's decision to sell a receivable."

ADJUSTING THE AUDIT PROGRAM

Given the increasing use of RF and the fact that its use is not easily identified, auditors should include audit program steps to address the concern. The first steps are to inquire of the client about the use of RF arrangements and test for RF arrangements as noted above. Once the presence of RF is established, reporting and disclosure issues are front and center. To this end, the audit program might include the following questions:

1. Are payment terms with suppliers extended beyond the original due date? If so, was extension due to RF arrangement(s)?
2. Do new payment terms apply to all suppliers (including those not participating in RF)?
3. Are suppliers required to participate in the RF program?
4. Does the client negotiate payment terms with the financial institution?
5. Does the client receive suppliers' invoices?
6. Does the client determine the fee charged to the supplier in the RF arrangement?
7. Does the client bear any risk or guarantee payment in any way to the financial intermediary (via agreement or collateral)?
8. Does the client receive any of the fee and/or other financial benefit from the RF arrangement?
9. Is there reference to RF in the financial record associated with accounts (trades) payable, accrued liabilities and/or other liabilities?
10. Is there reference to RF in the client's MD&A liquidity discussion?
11. Is there reference to and explanation of changes in days payable outstanding (DPO)?

The sources of information may include agreements with the financial intermediaries, suppliers, reference sources for industry norms, the MD&A of the annual report, the company's website, or other SEC filings (if applicable).

PREPARING FOR THE FUTURE

In the fourth quarter of 2020, the FASB added a project to develop disclosure requirements related to supplier finance programs involving trades payables. To accomplish this, FASB is developing an outreach with finance providers, preparers (buyers), and practitioners to understand the structure of the programs and obtain feedback on the key attributes of an RF program, information that companies monitor about overall payment terms, and potential disclosures. On June 30, 2021, the FASB met to consider and evaluate findings to date related to the project and followed on with a meeting with the IASB on July 23, 2021 on the same topic.

While the project work is on-going, preliminary indications are that disclosures should include key terms of the program as identified by management and the amount of obligations to suppliers (confirmed by the client) outstanding at period end and a description of where that amount is presented in the balance sheet and in the Statement of Cash Flows. At this point, the Board appears disinclined to require information from financial intermediaries. As such, auditors should consider the following RF-related disclosures in current audits:

1. Description of accounting treatment of end-of-period obligations (i.e., debt or trade payable)
2. Description of accounting treatment of RF transactions in and their impact on the Statement of Cash Flows
3. A description of the key terms of RF arrangement with suppliers and financial institution
4. A description of the utilization of the RF arrangement (e.g., percent of supplier participating)

5. The general risk and benefits of the arrangements, including any guarantees by or potential recourse to buyer
6. Explanation of how RF improved DPO and a description of any plans to further extend terms to suppliers
7. Any factors that might limit the ability to continue using similar arrangements to further improve operating cash flows.

A clear statement about accounting for RF was made in P&G's 2020 financial report, where one finds:

> *All outstanding amounts related to suppliers participating in the SCF are recorded within Accounts payable in our [P&G] Consolidated Balance Sheets, and the associated payments are included in operating activities within our Consolidated Statements of Cash Flows*

While Boeing provides spend metrics as a proxy for utilization:

> *Payables to suppliers who elected to participate in supply chain financing programs declined by $1.9 billion for the year ended December 31, 2020 and increased by $2.6 billion and $0.6 billion for the same period in 2019 and 2018. At December 31, 2020, trade payables included $3.8 billion payable to suppliers who have elected to participate in supply chain financing programs.*

SUMMARY AND CONCLUSION

This paper highlights reverse factoring as a form of supply chain financing and presents evidence of its increased use to settle traditional trades payable account balances. In addition, concerns expressed by the investor, regulatory, and auditors were presented. In general, the issue centers on the for guidance on classifying and disclosing RF in the financial statements, including the statement of cash flows. The paper highlighted the need to identify RF activity and suggested reading organizations' public releases in all forms including MD&A, press releases, web pages, footnotes disclosures, etc. Also, an evaluation of the DPO relative to the industry, DPO relative to changes from prior periods, and the magnitude of the change in the trades payable account between periods should be evaluated. Finally, this article presented potential footnote disclosure and items to add to the audit program of trades payable.

In conclusion, the use of reverse factoring (RF) is growing in the market, though the extent to which is uncertain due to current limitations in accounting guidance. Further, any cursory evaluation of the financial intermediaries providing RF services shows that RF activity is not confined to large corporations. Consequently, it is incumbent upon auditors to supplement and strengthen their audits procedures to address the proper accounting for and disclosure of the risks posed by RF activity.

APPENDIX. 2020 REVERSE FACTORING DISCLOSURES, COCA-COLA AND MASCO

Coca-Cola

As part of our continued efforts to improve our working capital efficiency, we have worked with our suppliers over the past several years to revisit terms and conditions, including the extension of payment terms. Our current payment terms with the majority of our suppliers are 120 days. Additionally, two global financial institutions offer a voluntary supply chain finance ("SCF") program which enables our suppliers, at their sole discretion, to sell their receivables from the Company to these financial institutions on a no-recourse basis at a rate that leverages our credit rating and thus may be more beneficial to them. The SCF program is available to suppliers of goods and services included in cost of goods sold as well as suppliers of goods and services included in selling, general and administrative expenses in our consolidated statement of income. The Company and our supplier agree on the contractual terms for the goods and service we procure, including prices, quantities and payment terms, regardless of whether the supplier elects to participate in the SCF program. The suppliers sell goods or services, as applicable, to the Company and issue the associated invoices to the Company based on the agreed-upon contractual terms. Then, if they are participating in the SCF program, our suppliers, at their sold discretion, determine which invoices, if any, they want to sell to the financial institutions. Our suppliers' voluntary inclusion of invoices in the SCF program as no bearing on our payment terms. No guarantee are provided by the Company or any of our subsidiaries und the SCF program. We have no economic interest in a supplier's decision to participate in the SCF program, and we have no direct financial relationship with the financial institutions, as it relates to the SCF program. Accordingly, amounts due to our suppliers that elected to participate in the SCF program are included in the line item accounts payable and accrued expenses in our consolidated balance sheet. All activity related to amounts due to suppliers that elected to participate in the SCF program is reflected in the line item cash flows from operating activities in our consolidated state of cash flows. We have been informed by the financial institutions that as of December 31, 2020 and 2019, suppliers had elected to sell $703 million and $784 million, respectively, of our outstanding payment obligations to the financial institutions. The amount settled through the SCF program was $2,810 million and $2,883 million during the years ended December 31, 2020 and 2019, respectively.

Net cash provided by operating activities for the years ended December 31, 2020 and 2019 was $9.844 million and $10,471 million, respectively, a decrease of $627 million, or 6 percent. This decrease was primarily driven by the decline in operating income, the extension of payment terms with certain of our suppliers in the prior year and the unfavorable impact of foreign currency exchange rate fluctuations. Net cash provided by operating activities included estimated benefits of $869 million for the year ended December 31, 2019 from the extension of payment terms with certain of our suppliers. We do not believe there is a risk that our payment term will be shortened in the near future, and we do not currently expect our net cash provided by operating activities to be significantly impacted by additional extensions of payment terms in the foreseeable future.

In the fourth quarter of 2020, the Company started a trade accounts receivable factoring program in certain countries. Under this program we can elect to sell trade account receivables to unaffiliated financial institutions at a discount. In these factoring arrangements, for ease of administration, the Company will collect customer payments related to the factored receivables and remit those payments to the financial institutions. The Company sold $185 million of trade accounts receivables under this program during the year ended December 31, 2020, and the cost of factoring such receivables were not material. The Company classifies the cash received from the financial institutions within the operating activities section in the consolidated statement of cash flows.

Masco

As part of our ongoing efforts to improve our cash flow and related liquidity, we work with suppliers to optimize our terms and conditions, including extending payment terms. We also facilitate a voluntary supply chain finance programs (the "program") to provide certain of our suppliers with the opportunity to sell receivables due from us to participating financial institutions at the sole discretion of both the suppliers and the financial institutions. A third party administers the program; our responsibility is limited to making payment on the terms originally negotiated with our supplier, regardless of whether the supplier sells it receivable to a financial institution. We do not enter into agreements with any of the participating financial institutions in connection with the program. The range of payment terms we negotiate with our suppliers is consistent, irrespective of whether a supplier participates in the program.

All outstanding payments owed under the program are recorded with accounts payable in our consolidated balance sheets. The amounts owed to participating financial institutions under the program and included in accounts payable for our continuing operations were $45 million and $29 million at December 31, 2020 and 2019, respectively. We account for all payments made under the program as a reduction to our cash flows from operations and reported within our increase (decrease) in accounts payable and accrued liabilities, net, line within our consolidated statements of cash flows. The amounts settled through the program and paid to participating financial institutions were $146 million, $164 million, and $117 million for our continuing operations during the years ended December 31, 2020, 2019, and 2018, respectively. A downgrade in our credit rating or changes in the financial markets could limit the financial institutions' willingness to commit funds to, and participate in, the program. We do not believe such risk would have material impact on our working capital or cash flows, as substantially all of our payments are made outside of the program.

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BLOOD BANK INVENTORY OPTIMIZATION WITH MACHINE LEARNING TECHNIQUES PROJECT PROPOSAL

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ABSTRACT

Machine learning techniques may improve the blood supply chain by reducing blood waste, expenses, and increasing patient health safety. Imagine if a patient were admitted to a hospital, but the required resources were not available to save them. Blood supply chain management tries to avoid such an occurance by providing enough inventory for uncertain demands. However, inventory surplus may occur with uncertain demands. Specifically, blood component inventory may experience surplus due to differing shelf lives of each component. The objective of the proposed research is to identify if machine learning techniques can better forecast red blood cells, a blood component, than current industry standards, autoregressive integrated moving averages. The blood supply chain will improve by reducing expenses, blood waste, and increasing patient health safety if red blood cells can be better forecasted.

I. INTRODUCTION

Recent research suggest that the current subsets of the healthcare supply chain may be improved upon. The goal of healthcare supply chains is to decrease wastage and shortage of resources, and to reduce costs while improving public health, patients' safety, and service level quality [6]. One subset of the healthcare supply chain is the blood supply chain, which is designed to proficiently manage blood product to ensure patients may receive it. It is vital to have efficient management to ensure patient safety, minimize waste, and reduce expenditures. However, before efficient management may take place descriptive data from source systems must be assembled into a data warehouse to ensure accurate insights may be made. In fact, this will allow for our question, how machine learning techniques may improve blood inventory, to be researched. To answer that question, data will be collected, a machine learning model will be built, the current industry model will be built, and the models will be compared. If one technique proves to be more efficient, the study will further fill the gap in research to improve blood inventory and blood supply chain management.

The remainder of this paper is structured as follows: Section 2 covers the background and significance of the research proposal, section 3 presents the formal question, while section 4 describes the objectives in answering the question. Section 5 details past and recent research related to the question and section 6 outlines the method in building and evaluating the models. Finally, section 7 concludes the research proposal.

II. BACKGROUND & SIGNIFICANCE:

Without blood management there is a risk of wasted blood and even the possibility of patient death. The blood supply chain was designed to deliver blood efficiently and effectively from donors to patients. Patients may receive a transfusion of oxygen or a form of bodily nourishment through a readily available blood component inventory. However, having an excessive supply on hand would be wasteful. According to the *2011 National Blood Collection and Utilization Survey Report,* the blood wastage is costing the United States' a substantial amount of money [7]. Minimizing waste is cost effective and ensures that sufficient inventory is readily available which will lead to increase in patient safety.

To proficiently minimize waste, the blood supply chain must encompass the same ideas as general supply chains. A supply chain involves activities, people, organizations, information, and resources required to move a product from inception to the customer [8]. Supply chain management, however, is the process of integrating the supply and demand management to make the supply chain efficient and effective [8]. The blood supply chain, or BSC, manages blood to ensure it reaches its customer or can be returned properly. For instance, the blood supply chain manages blood products from donors to patients in four stages [4]:

1. Blood Collection: Blood is voluntarily collected from donors and stored in blood bags.
2. Testing and Processing: The donated blood is tested and processed into four components: Plasma, Red Blood Cells, White Blood Cells, and Platelets.
3. Blood Distribution: Healthy, processed blood is distributed to different agencies of transfusion. (i.e., hospitals and clinics)
4. Wasted blood disposal: Blood not used, such as outdated blood, is returned to the blood center to be discarded of properly. For instance, red blood cells have a shelf life of no more than 42 days and platelets have a shelf life of only 5 days.

The BSC manages blood, as any supply chain manages its product, to ensure it reaches the customer, or patient the most efficient and effective way.

Donated blood is used to treat a variety of different conditions. Blood circulates through the body carrying nourishments, electrolytes, hormones, vitamins, antibodies, and oxygen. As previously mentioned, human blood is composed of plasma, red blood cells, white blood cells, and platelets. Plasma is a liquid that suspends the other blood components, red blood cells carry oxygen, white blood cells help the immune system, and platelets aid in blood clotting [2]. Each of the components are used to treat a range of patients such as those with cancer, blood disorders, shock, trauma, surgery, anemia, and blood loss [2]. For example, a single car accident victim could require as many as 100 units of blood [1]. Blood is a vital component of human life and can be the difference between life and death.

Inefficient management of blood can lead to blood waste or an insufficient inventory available to treat patients. In fact, Blood component wastage rates commonly run from one to five percent. In the United States, one to five percent of the 21 million blood products transfused annually amounts to 200,000 to 1 million wasted units, costing 46 to 230 million dollars [7]. However, if we limit the inventory too much then patients needing it could lead to increase hospital stays and an increase in their medical bills. Inadequate inventory could even cost a patient their life. To improve patient health safety, minimize expenses, and waste, recent research on machine learning techniques should be further explored.

Ensuring adequate inventory, minimizing the thousands, if not millions, of blood units wasted each year, would decrease costs and possibly improve patient health. The health of patients can fall solely on blood component transfusions, as it can provide the oxygen, nourishment, or antibodies the body needs. The blood supply chain was designed to effectively provide an inventory to ensure patient health and limit waste. With patient health in consideration, the inventory required versus the inventory available can vary widely. This variation could lead to excessive waste, such as the 200,000 units wasted in the survey report [7]. To save on unnecessary costs, while still ensuring sufficient inventory, is vital to minimizing blood component wastage.

III. PROBLEM STATEMENT:

Issues arise when there is not a central data location to store meaningful information that can address blood inventory waste. The hospital and laboratory that will be used in the study have two different data storage locations that have limited communication between the two systems. The lack of communication and granular data not only hinders analytical insights, but also prohibits laboratory technicians or scientists from communicating with hospital employees if questions emerge. Important operational data offloaded into a central data warehouse, used for business intelligence, would improve communication and optimize the blood supply chain. Important descriptive data that can lead to insights comes from combining the blood center and hospital data. Once the data is available, issues such as blood inventory waste can be addressed, such as the 2011 survey report of nearly 200 thousand units wasted annually [7]. We propose that novel machine learning techniques may improve blood component usage. The research question posed is:

- How can novel machine learning techniques optimize blood inventory?

IV. OBJECTIVES

The long-term goal of this research is to reduce blood waste and provide sufficient blood inventory according to factors processed by machine learning techniques. The first few months will focus on ensuring communication from both data storage locations to a centralized data warehouse. This will allow for vital data from both locations to be processed and analyzed. The current stage of study is to provide a preliminary literature review and conceptual framework for a machine learning technique and an industry standard comparative. The study has the following sub-objectives:

1. Provide a preliminary review of sources using machine learning techniques to minimize inventory waste, particularly found in healthcare.
2. Obtain non protected health information from the blood center and hospital of study.
3. Construct a data warehouse to contain data from the hospital and blood center's source systems.
4. Assemble a machine learning technique and an industry compared method to minimize blood waste.
5. Accurately compare and contrast the two forecasting methods to identify if one outperforms the other.

The results of this study may be used to limit blood waste and further improve the blood center's blood supply chain management.

V. PRELIMINARY LITERATURE REVIEW

In recent years, blood supply chain optimization is evolving and identifying new models to minimize wasted blood product. Most research found covering blood supply chain optimization involved linear models or a review of policies. However, a limited set of findings suggest that the typical linear model used, autoregressive integrated moving average (ARIMA), may be challenged by artificial neural networks (ANNs). This study will fill the gap in the research and identify if red blood cells (RBCs) can accurately be forecasted by ANNS. It will also further research to identify a more efficient way to forecast blood components and eliminate component wastage.

To alleviate blood waste, past research has varied in methods, prediction timespans, and varied in forecasting whole blood versus blood components. Formerly, research has mapped inventory, delivery, operations, and planning, as well as, reviewed ordering polices, and has studied blood donation forecasting to minimize blood waste [6]. Specifically, multiple studies have concentrated on linear concepts such as, moving averages (MA), exponential smoothing (ES), time series decomposition (TSD), and autoregressive integrated moving averages (ARIMA) [6]. ARIMA proved to produce accurate blood demand predictions compared to the other methods and has been used as an industry standard [3][6]. While each study produced similar results, there was variability in whether short-term or long-term demand was predicted. Where, weekly demand predictions were considered short-term and monthly demand predictions were considered long-term. The methods also differed in predicting whole blood versus blood components. Blood forecasting involves the use of temporal and spatial data, which means both estimating the amount of blood to be collected from donors and determining the places where these collections are more productive [4]. While blood component forecasting estimates the quantity of blood component bags required to meet hospital or clinic demands [4]. While there are multiple methods to minimize blood waste, ARIMA is the most accurate with different timespans and different types of forecasting for blood.

Recent research suggests a non-linear method such as, artificial neural networks (ANNs), predict blood demand just as well as past linear methods. When forecasting blood demand, Rhaifa Khaldi and his colleagues found that ANNs better predicted monthly blood demand because of ANNS ability to deal with stochastic data characterized by non-linearity [6]. However, on one account, Bahareh Fanoodi and his colleagues found that ARIMA and ANNs produced similar improvements to blood component predictions [3]. It is important to note, Bahareh Fanoodi's research forecasted platelet demand, which has a shelf life of five days. The short shelf life could be a reason why a large difference between the two methods was not present. Both research instances produced different results, however, each suggested future research into other neural network methods. None the less, the research findings suggest that ANNs is a comparative, if not better, method to typical linear models, such as ARIMA.

With new research findings, this study will fill the gap and forecast red blood cell (RBC) demand using neural networks. Red blood cells have a longer shelf life of 42 days, and the results may show a greater difference between ARIMA and ANNs; compared to Bahareh Fanoodi's results. Specifically, the study will examine weekly demand and forecast it based on proper factors found in the data. As one finding noted, the dimensionality of the data can be extensive [6]. If the dimensionality is large, feature selection will be used to alleviate it and to reduce redundancy. The major difference when comparing other methods to ANNs is that ANNs can perform complex nonlinear mappings. The mapping allows for a multidimensional input space that maps to a multidimensional output space [6]. ANNs also allow for real world phenomena by withstanding data with errors and using sequential training procedures to adapt themselves to new data [6]. This study will attempt to accurately forecast red blood cell demand to minimize waste of this blood component.

The blood supply chain can be more efficient by minimizing blood product wastage with the new research findings. The most recent findings fuel further investigation into machine learning techniques, such as ANNs, to further minimize blood wastage by forecasting weekly or monthly demand. The past linear model, ARIMA, is either lacking or comparative to the new technique. This research can further clarify if ARIMA or ANNs is more accurate at predicting blood components, specifically red blood cell, demand. By forecasting blood component demand the blood supply chain will be more efficient.

VI. METHODOLOGY

The steps taken to identify if ANN blood component demand accuracy exceeds ARIMA's accuracy consists of data collection, model building, model testing, and model comparison. In the first three months of the project, data collection and inventory will take place. Where data inventory is identifying what data the business collects. Once the data has been collected the process of formalizing the ARIMA and ANN models will begin. After identifying the appropriate models both will be compared to identify if ARIMA or ANN are comparative in nature or if one is better.

VI.1 ARIMA Model

ARIMA was first proposed as a model in 1970 by George E. P. Box and Jenkins. ARIMA is a linear combination of past errors and past values of a stationary series [3]. Non-seasonal ARIMA is denoted $ARIMA(p, d, q)$ where p, d, and q are non-negative integers. The order, or the number of time lags, of the autoregressive model is parameter p. The order of the moving average component is parameter q. Lastly, the degree of differencing, or the number of times the data have had past values subtracted, is parameter d. For instance, $d = 1$ suggests differencing between two successive periods of demand for the entire data set. However, if $d = 0$ the demand is stationary and ARIMA may be converted to an ARMA model [3][9]. Generally, the ARIMA model is given by equation (1):

$$y_t = c + \sum_{i=1}^{p} \varphi_i y_{t-i} - \sum_{i=1}^{q} \theta_i u_{t-i} + e_t \tag{1}$$

Where y_t, c, $\varphi_{(i=1,\dots,p)}$, $\theta_{(i=1,\dots,q)}$, y_{t-i}, u_{t-i}, and e_t respectively represents the time series, a constant coefficient, the parameters of the autoregressive model, the moving average model parameters, the pth lags of the dependent variable, the qth lags of the previous error, and the prediction error of the model at time t [3][9].

The ARIMA consists of three stages: identification, estimation, and testing models. After processing and reviewing information, the identification stage will confirm or deny if the data is stationary, or if there is an absence of a unit root [3]. If the data pattern is not stationary, the error of prediction model will increase, so more differencing is needed. For the study, the hypothesis of data stationarity will be tested using standardized Augmented Dicky-Fuller and Phillips-Perron tests. These tests will determine whether the mean and variance of the data are constant over time, or static. The autocorrelation function (ACF) will be used to identify the type and order of the model and examine reversibility. If both the self-correlation functions converge to zero, the model is inverse, and the prediction values will be correct and trustworthy. The least-squares (LS) method will be used to estimate the model parameters. Finally, to select the appropriate model: Akaike information criterion (AIC), Schwarz-Bayesian criterion (SBC), and Durbin Watson statistics (DW stat) will be used. The model selection, in the last stage of ARIMA, is evaluated using Ljung-Box test, where the significance of concurrent self-correlations with several lags are examined. This test investigates the randomness of residuals using self-correlation charts [3]. Each stage of ARIMA is critical to ensure the best model is produced.

VI.2 ANN Model

Neural networks, inspired by the human nervous system, are a method of approximating complex functions, commonly non-linear. A neural network consists of simple elements called neurons. The neuron is receiving inputs, processing inputs, and sending output signals. A series of neurons in a row forms a layer [6]. A network is formed when multiple layers are connected. Specifically, a network can consist of an input layer, hidden layers, and an output layer. To implement an artificial neural network the following steps should be taken [6]:

1. Data collection: Collect the data for processing.
2. Dataset Identification: Randomly partition data into input and desired output datasets.
3. Model Building and Setting: Choose the type of model learning (supervised, unsupervised, or reinforcement learning), as well as identify and fix the network parameters (i.e., net input, transfer function, learning function, learning rate, and number of neurons).
4. Data Preprocessing: Standardize or normalize the datasets.
5. Data Repartition: Divide the preprocessed data into training (identify weight and biases of the network), validation (analyze weights and biases), and test (validate weights, biases, and network performance) sets.
6. Simulation: During this stage, modify settings to obtain better results.
7. Results: Identify the residual mean square error (RMSE), mean square error (MSE), mean absolute error (MAE), mean absolute percentage error (MAPE) to compare results to ARIMA.

By trial and error while following these steps the study will identify the best ANN and compare its result to that of the ARIMA.

After data collection, an ANN and ARIMA will be built, tested, and compared to one another. The best ARIMA will be determined by the Ljung-Box test and the best ANN structure will be determined by trial and error. The two models will be compared by the RMSE, MSE, MAE, and MAPE. These statistics will allow the two models to be compared along the same baseline. The results from this study will fill the gap in previous research to identify if there is a significant difference between blood component forecasting.

VII. CONCLUSION

The blood supply chain and blood inventory can be further improved to minimize blood component waste. The goal of the blood supply chain is to provide blood products to patients who need it. Efficient blood management begins with descriptive data being readily available in a data warehouse for analytical inquiries. The research question, can machine learning techniques improve blood inventory, can be answered after the blood center and hospital data resides in a data warehouse. Once the previous task is completed, data will be pulled and a machine learning technique, along with an industry standard model, will be built. Finally, the models will be compared to determine if one model better accurately forecasts blood component demand. If the demand can be better forecasted, blood waste and expenses related to the waste can be reduced. Inherently, better demand forecasting will improve the blood supply chain and improve patient health safety.

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BOND MARKET RESPONSES TO GOVERNMENTAL ECONOMIC DEVELOPMENT INCENTIVES

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ABSTRACT

The economic development arm of many states will offer tax incentives in an attempt to entice existing firms to remain in their state or encourage new firms to move to their state. Such tax breaks are rational if the present value of the incremental taxes produced by the incentive exceeds the present value of the cost of the incentive. The problem in such an analysis is that the incremental tax revenues are unknown. This study uses the changes in state bond yields to ascertain whether or not the market perceives the tax incentive is rational.

INTRODUCTION

In late Spring of 2018, the state of Connecticut offered an $85 million dollar incentive package to General Dynamics Electric Boat division, with the hope of keeping Electric Boat as a major Connecticut employer into the future. Rhode Island followed suit a few days later with a $20 million dollar package of tax incentives in support of the Electric Boat's Quonset Point facility. These actions are not unique, as states have competed to attract or maintain employers within their states. Offering tax incentives to corporations in exchange for coming to the state, or not moving from the state, has become a cornerstone of economic development policy.

What is lacking in this discussion is an analysis of whether or not such incentives can be justified. It is reasonable to offer tax breaks to these corporations only if the additional tax revenues generated exceeds the taxes lost due to the incentive package. Measuring these additional tax revenues can prove to be extremely difficult. It is impossible to know what taxes would have been generated if the tax incentives had not been granted. Without the tax incentive, the company in question may have exited that market. However, it is possible that they may have remained in the market but did not expand their operation, or perhaps even remained and expanded without any tax incentives. Businesses that provide inputs and support services to the benefiting firm also pay taxes. How did the tax incentives to the benefitted firm affect the taxes paid by these ancillary firms?

There is also the problem with accurately determining the present value of the incremental tax benefits, assuming the actual incremental value can be estimated. The tax incentives are known, and therefore risk-free. The future incremental tax revenues are uncertain, and therefore need to be discounted to the present by an appropriately risk-adjusted discount rate. The difficulties associated with determining the relevant cash flows in such a situation boggle the mind.

PROPOSED STUDY

Event study analysis, introduced by Fama, Fisher, Jensen, and Roll (1969), has been used to determine the effect of various revelations of new information, such as acquisitions, dividends, stock splits, etc., on the firm's value. For instance, a positive movement in the stock price (relative to the general movement of the stock market) when a merger is announced suggests that the purchase enhances the value of the acquiring firm. A negative movement implies the price offered is too high, and the merger will result in a lower stock price.

While governments are not players in equity markets, they do have a significant presence in the bond market. Datta and Dhillon (1993) found that bond prices react to new information in a manner similar to stock prices. The yields on those bonds are a market measure of risk. An action that lowers the yield on a government bond suggests that the market interprets that particular activity as reducing risk, a positive market reaction. Likewise, if bond yields increase following a governmental action, then that is a market signal that such an action increases the bond's risk.

This study seeks to identify the relationship between economic tax incentives (offered by state and/or local governments) and the bond yield on their state debt. An increase in the cost of their debt would suggest that the market perceives that the present value of the tax incentive package exceeds the present value of the expected tax revenues and other benefits from this project. If their cost of debt declines, then the tax incentives offered are expected to produce sufficient incremental tax revenues to service the increased debt.

METHODOLOGY

The yield on a bond is a function of a number of variables. Some of these variables are at the macro level, such as the risk-free rate, expected growth in GDP, expected inflation, etc. Other influences are at the micro level and are firm-specific. The same holds true for state and municipal government bond issues. When analyzing the effect of tax incentive plans on government bond yields, it is necessary to isolate the effect of the tax incentive plan.

At the most basic level, the nominal interest rate (R_{NOM}) is the sum of the nominal risk-free rate (R_{RF}) and a default risk premium (DRP). This is often shown in the equation below:

$R_{NOM} = RF_{RF} + DRP$

If the market perceives a borrower as being riskier than before, the default risk premium will increase, causing their borrowing costs to increase as well. Conversely, less risk translates to a lower default risk premium and lower nominal interest rates for this borrower.

This study calculates the default risk premium of state bonds relative to the risk-free rate around the time of a specific event. The daily default risk premium is found for 60 days before the event and 60 days after the event. The means of these premiums are calculated and the difference between these two means is then estimated. Any significant difference between the before and after default risk premiums can be attributed to the event. This suggests the following hypotheses:

Null Hypothesis #1: Mean DRP_{POST} – Mean $DRP_{PRE} = 0$

Alternative Hypothesis #1: Mean DRP_{POST} – Mean $DRP_{PRE} \neq 0$

If the difference is significantly less than zero, then state bond yields have fallen after the announcement of the tax incentive package. This can be interpreted to mean that the market believes the tax incentive package will more than pay for itself. A positive average difference suggests the opposite, that the offer is too generous, and the state has become a riskier borrower.

This type of analysis could prove very useful for governments trying to package economic incentives to lure new industry to their area. The question they face is what should the value of the incentives be? Bidding too low may mean that you are outbid by another region when you could have offered more. Alternatively, there may be the "winner's curse," where you have offered more in the incentive package than the community will ever recoup in additional taxes. By observing the yield spread on the cost of your debt relative to federal government debt, you may infer how the market evaluates your bid. A decrease in the yield spread suggests that the market thinks the taxes that will be generated by the new economic venture will be in excess of the value of the incentives offered to attract the new venture.

DATA

Federal bond yield data are compiled and made public by the US Treasury. Data on state bond yields are more difficult to assemble. States issue numerous bonds to pay for a variety of projects. While some of these issues are general obligation bonds, many are revenue bonds, where the income from the project pays the costs of the bond. To capture the changing risk nature of the state associated with an economic incentive package, the returns to general obligation bonds should be used. Unfortunately, I have not been able to find the returns to this specific type of state bonds.

CRSP maintains the return to bond funds of individual states. These funds are not individual bonds, but a number of different bonds forming something akin to a mutual fund. The number of bond funds varies from state to state. CRSP reported data on up to fifty bond funds from California, but only two funds for Georgia bonds. The daily average return to the state's bond fund is calculated and used as the state's return for that day. In the absence of any other state bond data, the average returns to the state bond funds will be used for this study.

METHODOLOGY

This study will use Amazon's recent announcement that it was seeking a second headquarters location as the event. Amazon announced their plans to open a new headquarters on September 6, 2017. Over 200 cities submitted applications to Amazon to be the site of HQ2. These bids often included state funding in a variety of forms, such as additional infrastructure, lower (or no) taxes for some period, etc. In their attempt to lure Amazon's new headquarters to their area, the offers varied greatly. For instance, Montgomery County, Maryland, offered an incentive package valued at $8.5 billion, while Denver's offer was $100 million. It is difficult to believe that the value of the headquarters to a region could vary to that extent.

On January 18, 2018, Amazon announced the twenty finalists. On November 12, 2018, Amazon announced that it had selected New York City and Arlington, VA, as sites for the HQ2. Nashville, TN, was also designated to be the location of an operations center.

These three dates, Sept 6, 2017, January 18, 2018, and November 12, 2018, are the event dates. The default risk premiums from the average daily returns of state bond funds and risk-free Treasury returns will be calculated. The means of the pre-event default risk premiums and the post-event default risk premiums will be calculated. A difference in means test is then performed on the pre-event and post event averages.

RESULTS

Two tests were performed on the data. In the first test, the 60 days prior to the September 6 announcement was used as the pre-test period for the subsequent events. The results are shown in Table 1. None of the differences were significant at the 5% level. In fact, only two of the 36 differences evaluated were significant at the 10% level. Using the average returns prior to the initial announcement as the baseline default risk premium, it appears that neither the size of a city's offer to attract the headquarters location nor the fact that your city was the selectee (or non-selectee) seems to have had an effect on the perceived riskiness of the state's debt. The average default risk premium did not change significantly in any case.

The second test used the days prior to each event as the pre-event period, instead of using the period prior to the September 6 announcement as the pre-event period for the subsequent events. As before, none of the differences were significant for the initial announcement date or the date that the twenty finalists' cities were announced. However, for the date that the winners were announced (November 12, 2018), all of the differences were negative and significant at the 5% level. These results are shown in Table 2. This suggests that the market interpreted the announcement as good news for each of the finalists, as their default risk premiums all declined. Being the selected city offered no advantages in terms of perceived risk. This seems highly unlikely, so these results, while statistically significant, are suspect.

CONCLUSION

The purpose of this study was to determine if the changes in perceived borrowing risk would be evidenced by a single event. If this were actually the case, then it would provide public economic development professionals a market-based indicator of the appropriateness of their economic inducements offered to corporations. This study did not provide support for that hypothesis, so development officials will be forced to rely on more arbitrary estimates of the benefits of attracting a new employer to the region.

20 Finalist Cities

Atlanta, GA	Indianapolis, IN	Northern VA
Austin, TX	Los Angeles, CA	Philadelphia, PA
Boston, MA	Miami, FL	Pittsburgh, PA
Chicago, IL	Montgomery County, MD	Raleigh, NC
Columbus, OH	Nashville, TN	Toronto, ON
Dallas, TX	Newark, NJ	Washington, DC
Denver, CO	New York City, NY	

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Table 1

H_0 : Difference in the means (pre-event vs post-event) of the default risk premium = 0

(Differences taken from pre-September 6 data)

DATE		CALIFORNIA	COLORADO	FLORIDA	GEORGIA	MASSACHUSETTS	MARYLAND	NORTH CAROLINA	NEW YORK	OHIO	PENNSYLVANIA	TENNESSEE	VIRGINIA
9/6/2017	T stat	1.451	-0.848	-1.376	-0.826	-1.006	-1.684	-1.189	-1.02	-0.992	-1.181	-1.785	-0.692
	P value (2-tail)	0.148	0.397	0.172	0.41	0.316	0.094	0.236	0.308	0.322	0.238	0.076	0.49
1/18/2018	T stat	2.447	1.078	-0.963	0.19	-0.076	-0.532	-0.293	0.3887	-0.1	0.226	-0.775	1.141
	P value (2-tail)	0.014	0.282	0.338	0.85	0.939	0.594	0.77	0.698	0.92	0.822	0.44	0.256
11/12/2028	T stat	-0.476	-0.959	-0.796	0.663	-0.527	-1.22	-1.171	-0.509	-0.931	-0.842	-0.952	-0.34
	P value (2-tail)	0.634	0.338	0.428	0.508	0.6	0.226	0.244	0.612	0.354	0.4	0.342	0.734

Table 2

H_0 : Difference in the means (pre-event vs post-event) of the default risk premium = 0

(Differences taken from event date)

DATE		CALIFORNIA	COLORADO	FLORIDA	GEORGIA	MASSACHUSETTS	MARYLAND	NORTH CAROLINA	NEW YORK	OHIO	PENNSYLVANIA	TENNESSEE	VIRGINIA
9/6/2017	T stat	1.451	-0.848	-1.376	-0.826	-1.006	-1.684	-1.189	-1.02	-0.992	-1.181	-1.785	-0.692
	P value (2-tail)	0.148	0.03998	0.172	0.41	0.316	0.094	0.236	0.308	0.322	0.238	0.076	0.49
1/18/2018	T stat	0.381	0.676	0.055	0.398	0.52	0.602	0.498	0.223	0.567	0.106	0.257	0.162
	P value (2-tail)	0.0704	0.5	0.956	0.691	0.0604	0.548	0.619	0.823	0.571	0.916	0.797	0.871
11/12/2028	T stat	-3.049	-3.292	-2.661	-2.379	-3.171	-3.201	-3.015	-3.191	-3.6	-3.039	-2.87	-3.213
	P value (2-tail)	0.003	0.001	0.009	0.018	0.002	0.002	0.003	0.002	0.001	0.003	0.005	0.002

BRIDGING THE TAX GAP: KEY FACTORS FOR GREATER COMPLIANCE

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ABSTRACT

The Internal Revenue Service estimates the United States average annual gross tax gap is estimated at $441 billion dollars. Approximately 80%, or $352 billion dollars, is due to underreporting of income. Underreporting of income is not only understating or reporting less revenues or income, but also overstating deductions, tax credits, exemptions, and expenses. Both of those options, and especially a combination of the two, allow for a lower taxable income, leading to underreporting and expanding the tax gap. This paper explores causes of income underreporting. Understanding why taxpayers underreport their income can educate and guide policymakers in reversing the negative effects of our increasing tax gap. The tax gap is a growing epidemic that is plaguing the United States economy, and understanding why income is underreported can lead to better regulations for tax compliance.

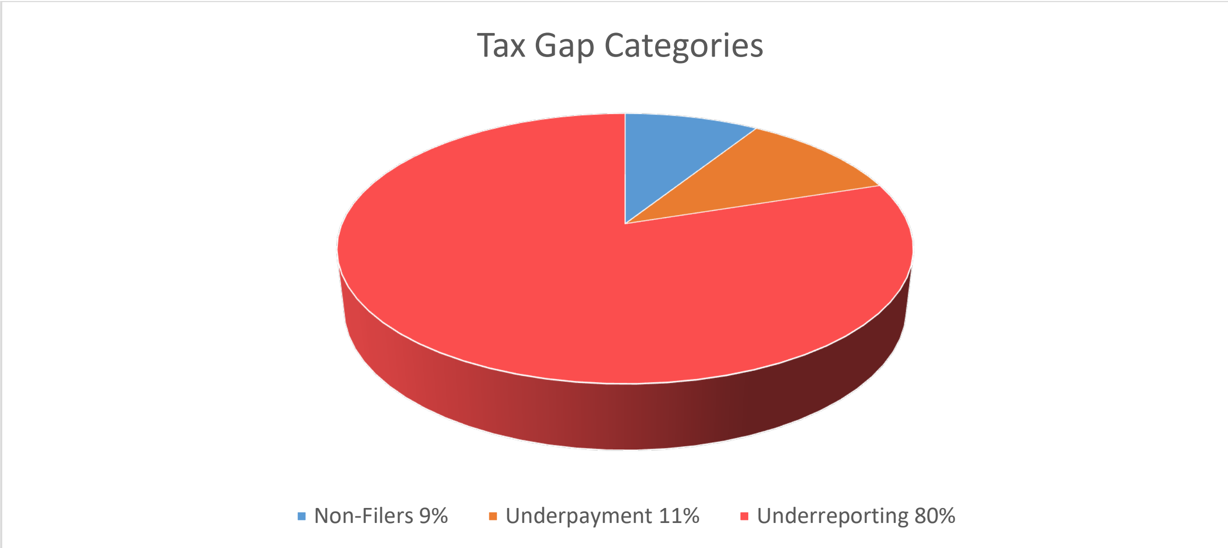
INTRODUCTION

Underreporting of income is becoming more prevalent, as the most recent report by the IRS indicates that approximately $352 billion goes unreported each year. The tax gap issue has been around for a very long time as prior research will show. Feige (2012) defined underreporting of income as "income not properly reported to the fiscal authorities due to noncompliance with the tax code." Tanzi and Shome (1993) added that "overreporting deductible expenses" also falls under the category of underreporting. However one decides to underreport, both are considered a form of tax evasion, which increases the tax gap.

The Legal Information Institute (LII) from the Cornell Law School website defined tax evasion as "using illegal means to avoid paying taxes" (Legal Information Institute, 2017). LII (2017) also stated "tax evasion schemes involve an individual or corporation misrepresenting their income to the Internal Revenue Service" and that "misrepresentation may take the form either of underreporting income or inflating deductions." Tanzi and Shome (1993) also mentioned that "tax evaders may not declare income; may underreport income, sales, or wealth; may overreport deductible expenses; may smuggle goods or assets; or may undertake some other deception."

"Underreporting of income is the single largest contributor to the tax gap, making it America's favorite form of tax evasion" (Roos, 2012). The Internal Revenue Service (IRS) defines the United States (U.S.) gross tax gap as "the difference between true tax liability for a given tax year and the amount that is paid on time" (IRS.gov, 2019). The IRS also defines the net tax gap as "the portion of the gross tax gap that will never be recovered through enforcement or other late payments" (IRS.gov, 2019).

The tax gap is composed of and separated into three distinct categories: non-filers, underpayment, and underreporting. Non-filers are those individuals or businesses who fail to file or submit a tax return. Non-filers are the smallest of the three categories that make up the tax gap, contributing about 9% of the overall tax gap. The underpayment classification is the category for taxpayers who do not pay the full amount of tax liability that they owe. Those who underpay make up roughly 11% of the tax gap. Underreporting of income is the largest contributor estimated at around 80% of the overall tax gap.



This study focuses on the largest of the three contributors, those who underreport income. This study explores the causes and opportunities that allow taxpayers to underreport. The research question for this study touches on why taxpayers underreport their income.

SOURCES OF UNDERREPORTING

According to IRS data provided in Exhibit 1, individual taxation accounts for the largest portion of the estimated underreporting portion of the tax gap, as well as being the largest contributor to the overall tax gap. It accounts for approximately $245 billion of the estimated $352 billion, or roughly 70% of the total for underreporting, which also correlates to 56% of the total gross tax gap of $441 billion. While individual taxation contributes the largest portion, employment tax, corporate tax, and estate tax contribute 20%, 11%, less than 1% respectively to the underreporting portion of the tax gap. Individual taxation also contributes the majority of the tax gap for non-filing and underpayment as well, amounting to 79% of the total for non-filers and 76% of the total for underpayment.

Within the underreporting category, business income represents the largest portion of the individual taxation component, accounting for $110 billion of the $245 billion, or 45%. Business income alone contributes 25% to the overall gross tax gap ($110 billion of the total gross tax gap of $441 billion). Spiro (1994) mentioned that studies from IRS audits "suggest that income is underreported to a remarkably high degree by some categories of small business people. For example, these studies suggest that the average sole proprietor's income-tax return understates his true income by about 60 percent." Business income accounts for twice as much as the next largest contributor in the individual taxation category, which is non-business income, representing $57 billion of the $245 billion, or 23%. The third largest contributor is tax credits, measuring $42 billion of the $245 billion, or 17%. However, if credits were added to the fourth highest contributor, which were adjustments, deductions, and exemptions (since they are similar in nature), combined they would make up $62 billion of the $245 billion, or 25%. The four contributors mentioned above, when combined, total roughly 52% of the total gross tax gap, which is $229 billion of the total $441 billion.

Employment tax (which contained self-employment tax) was separated from individual taxation. However, it still fell under the underreporting category. While accounted for in separate categories, most self-employment tax stems from individual business income. When added to the other four contributors mentioned above within the individual taxation category, self-employment tax would add an additional $45 billion. Doing so would then increase the total of the five major contributors to $274 billion of the total gross tax gap of $441 billion, making those five contributors alone accounting for roughly 62% of the total gross tax gap.

EXHIBIT 1 – SOURCES OF THE TAX GAP (IRS.GOV, 2019)

Tax Gap Component	Tax Year 2011 – 2013 (in billions)	Share of Gross Tax Gap
Estimated Total True Tax	**$2,683**	
Gross Tax Gap	**$441**	**100%**
Voluntary Compliance Rate	***83.6%***	
Enforced & Other Late Payments	**$60**	
Net Tax Gap	**$381**	
Net Compliance Rate	***85.8%***	
Nonfiling Gap	**$39**	**9%**
Individual Income Tax	$31	7%
Self-Employment Tax	$6	1%
Estate Tax	$2	<1%
Underreporting Gap	**$352**	**80%**
Individual Income Tax	**$245**	**56%**
Non-Business Income	$57	13%
Business Income	$110	25%
Adjustments, Deductions, & Exemptions	$20	4%
Filing Status	$5	1%
Other Taxes	$1	<1%
Unallocated Marginal Effects	$10	2%
Credits	$42	10%
Corporation Income Tax	**$37**	**8%**
Small Corporations (assets under $10M)	$11	2%
Large Corporations (assets of $10M +)	$26	6%
Employment Tax	**$69**	**16%**
Self-Employment Tax	$45	10%
Uncollected Medicare & Social Sec. Tax	$1	<1%
FICA & Unemployment Tax	$24	5%
Estate Tax	**$1**	**<1%**
Underpayment Gap	**$50**	**11%**
Individual Income Tax	$38	9%
Corporation Income Tax	$5	1%
Employment Tax	$6	1%
Estate Tax	<$1	<1%
Excise Tax	<$1	<1%

CAUSES OF UNDERREPORTING

Self-Assessment System of Reporting

Kwon (2014) stated that the United States uses a "self-assessment system" to report taxes, therefore allowing opportunities to understate income or overstate deductions. This has led to abuse of the system due to the self-reporting system that Kwon referenced. Individuals self-report their income and expenses though means of filing their taxes themselves, or providing information to a CPA firm or tax preparation business. Either way, individuals choose what they want to disclose on their returns, no matter who prepared it. "The IRS estimates that wage earners report 97 percent of their wages; the self-employed report 36 percent of their income; and 'informal suppliers'--self-employed individuals who operate on a cash basis--report just 11 percent of theirs" (GAO.gov, 1995).

If an individual fails to provide a CPA or tax preparer with the correct information, then the CPA or tax preparer can only enter the information they have. Individuals can choose to enter on their own, or supply their tax preparer, with erroneous deductions or expenses (credits, adjustments, deductions, and exemptions were a significant portion of the tax gap). They could also choose to omit or underreport their income (business and non-business income were the largest contributors to the tax gap). Alm and Soled (2017) mentioned that the "incentives to cheat on one's taxes are strong and abiding." The self-reporting system of taxes provides opportunities for underreporting, as the tax system itself has flaws.

Unmatched Income

Business and non-business income were the largest contributors to the tax gap, mainly because a large portion of income has become unmatchable. Phillips (2014) defined unmatched income as "income not subject to information reporting." The difference between matched income and unmatched income is the verification process. With matched income, a third party (employer for example) would send a copy of an employee's W-2 to the individual employee and a copy to the IRS. When the individual filed their taxes, the IRS can compare the information reported on the tax return to what showed on the W-2 to make sure the income matched.

An example of unmatched income would be cash payments. Cash is virtually untraceable, so any payments made with cash could go unreported, which has left the IRS without a method to capture those transactions. If all income were matched, the noncompliance for underreporting income would drastically decrease. Hamm (1995) mentioned that "if perfect information was available, compliance would be automatic". Hanlon (2020) stated that "there are much higher rates of noncompliance for forms of income into which the IRS has little visibility—usually business and capital income." The IRS has relied on a self-reporting system that individuals would report such transactions and payments as income, essentially creating an honor system that has failed.

Tax Code Complexity

The complexity of the tax code has had an impact on the tax gap as well. In a statement by the Members of the President's Advisory Panel on Federal Tax Reform, it was mentioned that "since the last major reform effort in 1986, there have been more than 14,000 changes to the tax code, many adding special provisions and targeted tax benefits, some of which expire after only a few years. These myriad changes decrease the stability, consistency, and transparency of our current tax system while making it drastically more complicated, unfair, and economically wasteful. Today, our tax system falls well short of the expectations of Americans that revenues needed for government should be raised in a manner that is simple, efficient, and fair" (Finance.senate.gov, 2006).

Russell (2016) claims the number of pages in the federal tax code is 74,608. This page count does include the tax code itself, plus tax-related case law and other regulations which help interpret, define, and clarify the tax code. The Taxpayer Advocate Service (TAS) (2012) mentioned that "the tax code has grown so long that it has become challenging even to figure out how long it is." An individual filer, nor a CPA for that matter, could know all the details of the entire tax code. The amount of complexity for tax compliance can be summed up by the TAS. The TAS (2012) reported that if tax compliance were an industry, it would be one of the largest industries in the United States. It is reported that tax compliance takes up about 6.1 billion hours per year, which is the equivalent to about 3 million full-time workers (TAS, 2012).

Not all of the amounts of underreporting contributing to the tax gap have been unreported purposefully, as some have been true and honest mistakes due to the complexity of the tax code. However, whether income has been purposefully underreported or due to an honest mistake, the tax code has become overly complex. Winnick (1995) mentioned that the "taxes and regulations are burdensome". Rutkowski (1995) stated that "the IRS is motivated largely by its desire to identify all sources of income, without considering how it was generated." The IRS and the government have attempted to reduce the tax gap by deploying new tax codes, but those attempts just increase the complexity. "It tends to complicate the tax structure as legislators try to anticipate tax evasion through tax legislation" (Tanzi and Shome, 1993).

The IRS and the legislators have also raised taxes to attempt to make up the shortfall of the tax gap, but higher taxes have led to individuals reporting less income to avoid paying higher taxes. The legislation has been long overdue to find ways to simplify the tax code. "Calls for tax simplification often focus on the tax system itself—the number of taxes, the tax bases, the exemptions and the structure of tax rates. However, the contributions from the 11 countries (study by the authors) suggest that major simplification of tax systems is relatively rare. Some countries such as the United States (US) have proposed simplification of this sort but without much success" (Budak, James, & Sawyer, 2016). Until the code is simplified, taxpayers will find ways to circumvent the tax filing process in order to conserve their income and reduce their tax liability.

Low Audit Rates

In referencing the 1972 paper written by Allingham and Sandmo about tax evasion, Manhire (2014) mentioned that "evading taxes is akin to playing a lottery". According to Manhire (2014), "The Allingham and Sandmo model predicts that most taxpayers should underreport tax on their returns". Tanzi and Shome (1993), also referring to the Allingham and Sandmo model, stated "the probability of being caught are very low". The driving force behind that statement are that the odds of a taxpayer chosen for an audit are slim. With low audit rates, the chances that a taxpayer would be selected to be audited are less than one in a hundred (Wood, 2016). McTigue (2019), who is the Director of Strategic Issues for the United States Government Accountability Office, mentioned that the individual tax return audit rate has decreased from 1.1% in 2011 to 0.5% in 2019.

McTigue (2019) also reported that IRS staffing has declined by approximately 20.8% since 2011, as the number of full-time equivalent employees has fallen from 95,544 to 75,676. If a taxpayer only has a half percent chance of being audited, then that would certainly lead to a higher risk of tax evasion and underreporting of income, especially coupled with the decline in the IRS staffing. Dubin, Graetz, and Wilde (1990) gathered data which showed "that the audit rate positively influences the level of compliance." Essentially, the higher the audit rate, the higher the compliance. It has the inverse effect as well, so the lower the audit rate, the lower the compliance. Fleming (1995) showed "that the rate of noncompliance decreased as audit rates increased." However, with a very low audit rate, taxpayer compliance will continue to be an issue.

Low Penalties

Coupled with low audit rates, low penalties for noncompliance also do not deter taxpayers from underreporting their income. Taxpayers are aware that the chance of an audit is low, and if the taxpayers go through an audit, the penalties for noncompliance are low as well. The IRS has relied on taxpayer's knowledge of penalties to act as a deterrent for noncompliance with the tax code. However, "most of the penalties are unknown to the majority of tax-payers, calling into question their possible deterrent effect" (Morris, 2010). The maximum penalty for non-criminal fraud is 75%, according to IRS Statute IRC 6663. To put that in perspective, and assume a 1% chance of an audit, a taxpayer could withhold $100 and not report that as income on their tax return. The maximum penalty would be $75 ($100 x 75% penalty), so $175 would be owed to the IRS if the taxpayer was caught purposely withholding that income.

If the taxpayer took into account the low odds of an audit of 0.5%, the potential cost to withhold the $100 would be $1.75 ($175 potential owed x 0.5% audit probability = $0.875). The benefit of not reporting the income outweighs the potential cost, so the penalty would not deter the taxpayer from underreporting that income. Even if the taxpayer were in a 35% tax bracket, the net effect of properly filing the $100 properly would result in a tax liability of $35 ($100 x 35% tax rate). The taxpayer could then weigh the $35 proper tax liability versus the potential $0.875 weighted cost, which would result in the taxpayer coming out better by playing the odds.

IRS Distrust

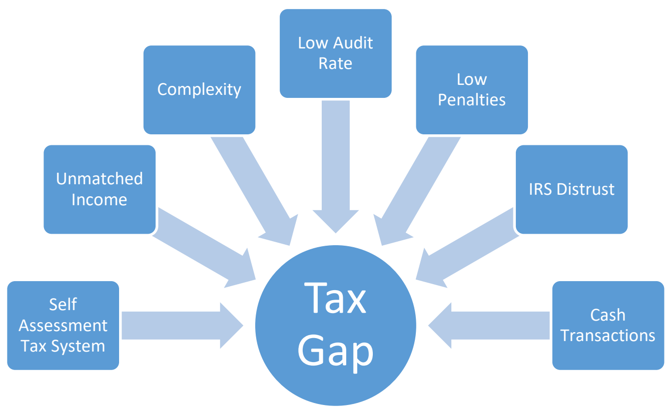
Many taxpayers feel the need to stick it to the system because they just do not particularly like the IRS. "A poll even showed that 12 percent of taxpayers liked Vladimir Putin better than the IRS" (Wood, 2016). The strong dislike for the IRS has caused taxpayers to abuse the system. The TAS (2012) found that only 16% of sole proprietor business owners surveyed claimed that tax laws are fair. Carlson (2013), which referenced a Huffington Post survey with YouGov, stated that 59% of the Americans surveyed had an unfavorable or strongly unfavorable opinion of the IRS, compared with only 21% that had a favorable or strongly favorable opinion, the other 20% were undecided. According to Murray (1997), "The IRS is perceived by many to be overly intrusive." which may have led to some of the poor opinions of the IRS. All Americans like their privacy, so the lack of trust and intrusiveness of the IRS add to the negative opinions, which in turn has caused Americans to find a way to cheat the system, and contribute to the tax gap.

Cash Transactions

Cash transactions have played a huge role in contributing to the tax gap, as cash is essentially untraceable by the IRS. Hill (2017), referencing a study by Finder.com, mentioned that one out of every four Americans now have a "side gig", which earn an "estimated $214.6 billion" per year that goes unreported to the IRS. The types of jobs listed were "dog walking/pet sitting, selling crafts or goodies, house cleaning, babysitting, tutoring, handyman work, gardening and more, often for undeclared cash." While those are some examples of side jobs, the majority of cash transactions involve more than just side jobs. Some full-time jobs deal with cash, like tips for waiters and waitresses, landscaping, construction work, laborer, and mechanic, just to name a few. These jobs require the taxpayer to report all income on their tax return, as any and all cash payments are considered income.

Construction and other laborer jobs have long been associated with under-the-table payments, as many of the workers are paid in cash. By paying cash wages, it also keeps the contractor from filing and paying payroll taxes, so they come out better by paying cash. All activities contributing to income, whether legal or illegal, are subject to income tax reporting. It is safe to assume that those partaking in illegal activities do not report income from their illegal activities, but those illegal activities have contributed to the tax gap. Whether legal or illegal, the lack of reported income has had a significant impact on the rise of the tax gap, as more workers are receiving cash payments. The cash payments have led to an undetected payment system, which has been referred to as the underground economy.

EXHIBIT 2 – CAUSES OF UNDERREPORTING CONTRIBUTING TO THE TAX GAP



UNDERGROUND ECONOMY

The underground (or shadow) economy was created and has been fueled through use of under-the-table cash transactions. "The shadow designation implies a realm of economic activity in which its participants prefer to remain out of sight" (Wiseman, 2013). Rutkowski (1995), having referred to Harry Greenfield's definition, defined the underground economy as "the production and distribution of goods and services, that for the most part, are initially undetected (and therefore unrecorded) in the U.S. national income and product accounts (NIPA)." The underground economy involves "activities that generate income that is not reported for income taxation" (McCrohan, Smith, and Adams, 1991).

Winnick (1995) also stated that the underground economy involves "legally gained income shunted in part or whole off the books primarily for the purpose of evading taxes." The underground economy also contains transactions dealing with illegal activities as well. The underground economy has long been a hiding spot for under-the-table transactions and dealings, mainly involving cash due to its difficulty to trace. Cash is king in the underground economy. The motivation behind the underground economy is to make deals and transactions without a paper trail, which also helps avoid reporting and paying taxes.

Sources of the Underground Economy

When an employer pays an employee in cash, not only does it help the employee to avoid paying income taxes, but the employer does not have to pay their share of the employer tax as well. The employer could dodge paying payroll taxes, insurance, retirement, and other costs associated with maintaining employees, which could be a significant savings depending on the size of the company. With less reporting requirements due to cash payments, there would also be less of a need for formal bookkeeping, so the employer could also potentially save on accounting expenses.

With the current trend of budget cuts and outsourcing, many employees lose their jobs and find themselves unemployed. Until they find a new job, they could go underground to work to be able to pay the bills. “Many individuals could go underground (escaping taxes to help compensate for income reductions) when they lose their regular jobs” (Spiro, 1994). As mentioned prior about side jobs, those are mainly considered underground as there has not been a way to trace those types of jobs. Jobs with unmatched income has left the door open for taxpayers to underreport their income. While waiting tables, bartending, valeting cars, and other service type industries are not underground jobs, those who perform these types of jobs receive cash tips, which can go unreported. Roos (2012) claimed that “The IRS estimates that waiters and waitresses underreport their cash tips by an average of 84 percent.”

Self-employed individuals have an easier path to cash transactions and makes it easier to conceal transactions. “Since those who work for themselves face less oversight (e.g., in terms of cohorts monitoring their behavior), it is probable that they will be more likely to engage in shadow economic activity than persons employed in larger firms” (Wiseman, 2013). Even if they hire a tax professional to do their financials, a CPA can only use the information provided to them. Gianakaris (2014) stated that a “large part of this shortfall (tax gap) can be attributed to self-employed small business owners.”

While many jobs are legal (they just pay cash under the table), illegal activities also are a part of the underground economy. Illegal activities, such as selling drugs and illegal gambling, are just a couple of examples. “Since cash usage is anonymous, without leaving a paper trail, it is the preferred medium for purchasing illegal goods and services and for hiding income that should be, but is not reported to the tax authority” (Feige, 2012). Obviously, those who partake in illegal activities would not report income from those activities on their taxes, and this has been a problem contributing to the tax gap for as long as the system has been in place.

PRIOR SUGGESTIONS

There have been numerous suggestions on how to reduce the tax gap. Most suggestions seem to deal with some sort of tax reform, whether it be a change in tax rates, deductions/credits, standard deductions, exemptions, capital gains, estate taxes, etc. While changing those would potentially bring in more revenue for the United States, it does not address the problem at hand, which is to find the source of the problem of underreporting. Changing certain aspects of the tax code would change the amounts reported, but again, that would only affect those who actually properly report their income. The honest American taxpayer would be hit with the changes, not those who illegally underreport.

The Fair Tax was one method of tax reform. The Fair Tax suggests we have a national consumption tax on items that individuals would purchase. It is essentially a higher sales tax on any items purchased for personal consumption. On the surface, everyone would have to pay taxes at that point, even those living here illegally and those who partake in illegal activities. The downside is the more you buy, the more you pay. This would somewhat discourage spending, especially those with lower salaries. Of all the different proposals, this reform could potentially help curtail the tax gap the most, as everyone would pay taxes on what they purchase. However, it would not address those paying each other in cash under the table in the underground economy. It would only help if everyone purchased from legit businesses and retailers.

The Flat Tax was also introduced, which would be a single, flat tax rate for all taxpayers. There would be limited deductions, but would be a simple method of filing since everyone pays the same rate. However, this would not address those who underreport their income, so this would not specifically address the tax gap, as those who underreport could still do so.

A Value Added Tax was proposed, which is a consumption tax similar to the Fair Tax, but a smaller rate of tax is imposed every time a good or product is sold or when value was added. Essentially, a good or product would be taxed when the manufacturer sells it to a wholesaler, then again when a wholesaler sells it to a retailer. One issue with this is that the tax is added to the selling price at each step, essentially passing the cost on to the consumer, which would most likely lead to much higher prices on goods and products.

While these approaches have pros and cons, they really do not address the issue at hand, which is finding ways to eliminate the tax gap. Repealing and replacing certain components of the tax system will only affect those who report properly, so it does not reduce the problems for those who underreport.

BENEFITS OF BRIDGING THE TAX GAP

The issue with the tax gap has been that someone has to make up the shortfall for those who do not pay or report properly. The TAS (2012) found that only 12% of those surveyed believe taxpayers pay their fair share of taxes. That tax burden has shifted to the honest taxpayers. "At the most basic level, the tax gap is an injustice. It means that honest taxpayers are bearing the financial burden of those who do not pay what they owe. The taxpayers who play by the rules – regardless of income bracket – pay more in taxes to make up for those who game the system and cheat. In a very tangible way, honest taxpayers are subsidizing those who evade their taxes" (Finance.senate.gov, 2006). Taxes would not need to be levied at such a high rate if everyone self-reported their taxes in accordance with the tax laws. "Taxpayers pay about 17 percent more in taxes to subsidize those who do not pay the taxes they owe" (Furman, 2006).

The billions of dollars that go unreported and uncollected take a toll on the economy as well. "It is therefore suggested that tax authorities should foster affective commitment and help taxpayers see how being tax compliant is relevant to the goals of their country" (Bornman & Wessels, 2017). While taxpayers gain on an individual basis by underreporting income, the nation and government programs suffer. "The underground economy constitutes one big IOU to all conscientious taxpayers who will never realize any public benefit that could flow from collecting the taxes due on such monies" (Rutkowski, 1995). Federally funded programs such as Medicaid and others could benefit from the unreported funds. Social security could be salvaged and more funds could be allocated to those types of programs, which would create a public benefit. However, the national debt has continued to climb and budget cuts have been made at many levels, including those that would benefit the American taxpayers the most.

"Reducing the tax gap could help reduce the nation's large budget deficits, modestly reducing the need for tax increases or spending reductions" (Furman, 2006). If all the tax funds were collected, that could lead to more jobs as less budget cuts would be necessary. With the labor force making up the majority of most government departments, they usually receive the first cuts due to the budget restraints. Collecting the majority of taxes owed could help reduce the unemployment rate as jobs could be salvaged or created. "Underreporting not only impacts tax integrity, but the integrity of official survey findings on average wages and salaries and for the compensation of employee value included in the national accounts data" (Warren, 2019). Other than jobs, less budget cuts would lead to maintaining programs like Medicare and Social Security, but other vital departments like the military. The world has been in enough turmoil, so we need our country's defenses at their best.

With collection of more taxes, the nation's cash supply could potentially improve. "Federal Reserve surveys of household currency usage found that U.S. residents admitted to holding less than 10% of the nation's currency (cash) supply. Businesses admitted to holding 5%. It seems that the whereabouts of roughly 85%

of the nation's currency supply is unknown" (Feige, 2012). The 85% of the unknown cash whereabouts could most likely be circulating in the underground economy. That could potentially explain the massive amount of the tax gap. While not all of the unknown cash whereabouts are underground (with a decent amount in offshore accounts and some tucked under a mattress somewhere), cash has been a significant problem that has plagued the U.S. economy and significantly contributed to the tax gap.

Conclusion

The underreporting of income is a major issue facing the IRS and United States today. Utilizing prior research and identifying factors that contribute to the tax gap, it is evident that the tax system the U.S. currently has in place, and the tax codes associated with our current system, needs reform and simplification. Different administrations have attempted to change the tax code over the years, but it really does not address the issues contributing to the tax gap. Until the tax code is simplified, even honest individuals may inadvertently underreport just due to the lack of knowledge necessary pertaining to the tax code. However, it has been suggested that the majority of the underreporting is done with intent to circumvent the system.

Since cash does not have much of a paper trail, it is hard for the IRS to track. It would take too much time, effort, and wasted resources to attempt to track those transactions. Increasing the audit rate (currently about 0.5%) could potentially help, but that is throwing more money at a problem that most likely cannot be solved simply. As long as cash is around, the issue with the tax gap will be a recurring issue.

Bottom line, the tax system is the United States of America has flaws, and as long as there are rules, they will be broken someway, somehow. The tax code does not help itself with loopholes and gray areas, so a major overhaul is probably needed. The tax gap cannot, and will not, be bridged anytime soon. Unless cash is removed from society, then that will always be a problem that the IRS and the government cannot control or repair. The U.S. will just continue to miss out on $352 billion dollars per year, as they do not have the time and resources to correct the problem. Bridging the tax gap may sound like a grand plan, but attempts seem to be directed to a burning bridge, badly in need of repair.

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CHARACTERISTICS AND LEADING INDICATORS OF MARKET INTEGRATION FOR EMERGING ECONOMIES

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ABSTRACT

The paper identifies a subset of countries with a relatively high likelihood of being emerging market economies close to market integration. The sample is filtered down in two stages to identify which countries have reached market integration and to obtain a timeline of integration for those countries. Once the timeline is obtained, those remaining countries are analyzed over various metrics to identify patterns and potential leading indicators that can signal an incoming market integration.

INTRODUCTION

In 1981, Antoine W. van Agtmael, who was then deputy director of the capital market's department of the World Bank's International Finance Corporation, coined the term emerging markets. He wanted to define a word to characterize a country which is beyond the stage of a "Third World" country, but has not quite reached the level of a developed economy [21]. It is in this "emerging" stage of growth where a country becomes an established member of the global economy, effectively reaching market integration.

Market integration refers to the process by which an economy opens up to the outside world: capital markets attract outside investments, expected returns decrease as the risk premium lessens, and financial regulations strengthen the state of the local financial industry, among other economic effects.

There has been a swath of prior research done on the effects of market integration on financial markets and asset prices. This paper, however, takes a multi-dimensional approach to view market integration in a new light. First, we create a sampling methodology by which to choose 25 countries to analyze. We then perform a two stage filtering process. The first stage is meant to remove from the list any countries which do not appear to meet all the introductory criteria for market integration. The second stage has two purposes: to further filter out any countries that do not show signs of market integration, and then for those countries that make it through the filter, provide a rough timespan by which to identify when market integration was achieved. Upon completion of the two-stage filtering process, the final step is to use the dates obtained from the second stage of filtering and identify commonalities within the social environment of each country which could describe leading indicators of market integration. In essence, these would be ex-ante characteristics that would forecast imminent integration of an emerging market economy.

This paper is organized using the process outlined as follows: First, the sampling methodology is outlined, explaining the indexes and reports used, such as the MSCI Emerging Markets Index and the WEF Competitiveness Report. Then, we go into the two-stage filtering. The first stage looks at more superficial criteria such as whether a country has a company cross listed on the NYSE or if the country has introduced basic financial markets regulations. The second stage takes a much more expansive approach, using multiple characteristics to judge and date market integration, such as FDI Inflows/Outflows, GDP Growth, and Real Interest Rate movements. Finally, the last section of the paper focuses on social factors which were found to be evident across a large subset of the countries, specifically Patent Applications, Gross Savings, Energy Use, and Infant Mortality. These factors are shown to predate market integration and could define potential signals that a country is nearing integration.

CREATING A SAMPLING METHODOLOGY

According to the UN Department of Economic and Social Affairs [17], there are over 100 countries classified as "developing economies". An efficient sampling methodology has to be utilized in order to effectively analyze a wide group of countries from among those developing economies that could show signs of having reached market integration.

We start by identifying different groupings and classifications which exist to define an emerging market, the first of which is BRICS [20]. A term coined by members of the Goldman Sachs Global Investment Research Division, it is used to define the rise of emerging economies, mainly Brazil, Russia, India, China, and later South Africa. Due to the extensive amount of work done around the economies of these countries, they are deemed high priority and have a relatively large likelihood of having reached market integration. The second classification, also done by the Goldman Sachs Global Investment Research Division classifies the Next Eleven (N-11) countries. Upon witnessing the rise of BRICs countries to be more prolific than previously expected, the GS N-11 paper works to identify a broader list of countries with the potential to have a similar impact as the BRICs economies [19]. The N-11 countries consist of South Korea, Mexico, Bangladesh, Egypt, Indonesia, Iran, Nigeria, Pakistan, Philippines, Turkey, and Vietnam. These countries are also labelled high priority and included in the sample we utilize.

Subsequent countries added to the sampling list come from analyzing two factors: development as displayed by the WEF Global Competitiveness Reports, and emerging market economies as detailed by classifications created by numerous firms.

The Global Competitive Report by the World Economic Forum provides an expansive list of countries, ranked by their competitiveness, or the attributes that allow for a more efficient and productive economy. The WEF index uses a framework centered around four key indicators and 12 related pillars: Enabling Environment (Institutions, Infrastructure, ICT Adoption, Macroeconomic Stability), Markets (Product Market, Labor Market, Financial System, Market Size), Human Capital (Health, Skills), and Innovation Ecosystem (Business Dynamism, Innovation Capability). For the purposes of sampling, an analysis of the rankings from 2006 to 2019 is conducted, searching for significant increases in rank over this time period. The main reason for the selection of this time period is availability of data. For countries that made substantial upswings in rank, it provides evidence of stronger social, economic, and political variables. Although these are not financial characteristics of market integration, all the leading developed economies of the world can be seen to consistently top off the rankings, signaling that significant changes in ranking could point to proximity to market integration. Upon further analysis of all countries featured in the report, the largest positive changes in rank over the 13-year period were by countries who went up by 20 or more positions in the list. The countries that met this requirement are the United Arab Emirates (UAE), Azerbaijan, China, Indonesia, Philippines, Qatar, Russia, Turkey, and Vietnam. Some of these have already been added to the sample, which leaves UAE, Azerbaijan, and Qatar to be added, putting the current list at 19 countries.

The final determination of high priority countries comes from analyzing emerging markets indexes and classifications published by numerous firms, mainly the Financial Times Stock Exchange (FTSE) Emerging Markets Index, MSCI Emerging Markets Index, S&P Emerging Broad Markets Index (BMI), Banco Bilbao Vizcaya Argentaria (BBVA) Emerging and Growth-Leading Economies (EAGLEs), and BBVA Nest Economies. All of these firms apply proprietary methodologies to classifying emerging economies, largely based on expected growth levels, market capitalization, and liquidity, among other macro-level factors. Upon aggregating a list of the countries which compose all five of these indexes, the countries selected for sampling are those that appeared on at least four out of the five lists. Each firm applies differentiated methods to classifying these countries as emerging economies. So, when countries are selected by multiple different firms, it signifies a broader acceptance that the country is an emerging economy with a higher potential of market integration. The analysis resulted in six more countries: Chile, Colombia, Malaysia, Peru, Saudi Arabia, and Thailand to be added to the sample.

The sampling methodology is thus concluded with 25 countries being selected to move forward with further analysis: Azerbaijan, Bangladesh, Brazil, Chile, China, Colombia, Egypt, India, Indonesia, Iran, Korea, Malaysia, Mexico, Nigeria, Pakistan, Peru, Philippines, Qatar, Russia, South Africa, Saudi Arabia, Thailand, Turkey, United Arab Emirates, and Vietnam.

INITIAL COUNTRY FILTERING

Once the sample is established, the first stage of filtering begins to understand whether or not a specific country has reached market integration. There are three categories used to conduct the filtering process: First Local Equity Listing or First ADR Listing, Cross-Listing (On the NYSE), and Capital Market Regulations. Literature has been published around dating market integration and identifying key events leading to integration: Bekaert and Harvey [2]. The three categories used are in line with prior findings around dating market integration. In this initial stage of filtering, rather than creating a timeline of integration for each country, the goal is to understand whether each country has even had those key events occur. Specifically, the goal is to analyze whether the country has had its first local equity listing, a domestic company or ADR cross-listed on the New York Stock Exchange, and some type of organization similar to the SEC to govern the financial market in that country.

Information on the first local equity listing and related creation of an official stock exchange is obtained from the website of the stock exchange of each country. Similarly, capital market regulations are found on the same website or a related governmental website for each country. Cross-listing details are obtained directly from the New York Stock Exchange.

As outlined in the sampling methodology, only those countries with a high likelihood of having reached market integration were included in the sample. For this reason, a majority of the countries in the sample already meet all three criteria of integration currently being filtered for. The criteria which disqualifies the most countries is having a domestic equity or ADR cross-listed on the NYSE. Through all the countries analyzed, a stock market has been established in all of them and some type of capital markets regulating body similar to the SEC exists throughout. However, a sizable number of countries have not been cross-listed through either a domestic company or an ADR. 11 countries are found to not meet this requirement, leaving them less likely to have obtained market integration. The 14 countries remaining after the initial country filtering are: Brazil, Chile, China, Colombia, India, Indonesia, Korea, Mexico, Peru, Philippines, Russia, South Africa, Thailand, and Turkey.

Upon completion of the initial filtering, these remaining countries can be understood as having a higher likelihood of having achieved integration. The specifics of which country has achieved it, and the timeline as to when it happened, will come out of the second stage of filtering.

STAGE TWO FILTERING

Stage Two filtering takes a more expansive approach and involves a multi-stage process. Five categories are used in order to analyze the stage of market integration of a country: FDI Net Inflow/Outflow (% of GDP), Real Interest Rates, GDP Growth Rates, Debt Service on External Debt (Public & Publicly Guaranteed), and Portfolio Equity Net Inflows (subsections A-E) From there, the final timeline is displayed, any discrepancies are validated, and the overall results are shown (subsections F-H). For the sake of simplicity, in each category analyzed, only one sample country is displayed to highlight the methodology of analysis, and that same methodology is used for the remaining countries not shown.

All data used for this stage of filtering as well as Section V: Determination of Leading Indicators of Market Integration, are obtained from the World Bank Open Database and are being analyzed in Microsoft Excel as a part of this research. The data date from 1960 to 2019.

FDI Net Inflow and Outflow (% of GDP)

For the purposes of this research, as defined by the World Bank, FDI Net Inflow and Outflows (% of Nominal GDP) are incoming/outgoing investments to acquire 10 percent or more of voting stock in an enterprise operating in a country other than that of the investor. The investment primarily includes equity capital, reinvestment of earnings or other forms of capital as shown in the balance of payments. More simply put, FDI inflow represents external interests in a country and FDI outflow represents investments directed outward to other countries.

From an FDI perspective, an integrated country should be interacting with the global economy on both sides. This means FDI inflow and outflow should begin to move together, and as the sample of countries is analyzed, this comes to light. Moving together doesn't necessarily mean searching only for high levels of correlation (e.g 0.7 and above). It is all relative, so there should be noticeable increases in correlation, but not necessarily high correlation.

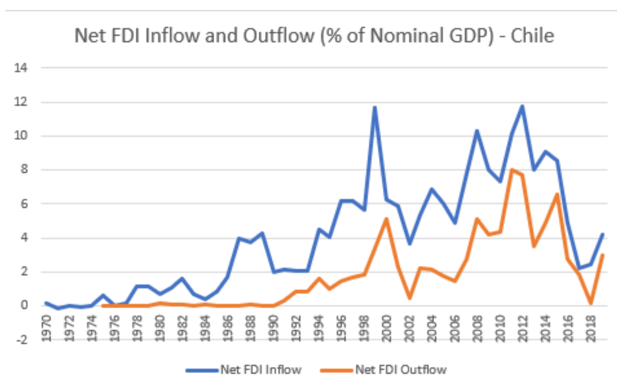

FIGURE 1 - CHILE FDI INFLOW & OUTFLOW (% OF NOMINAL GDP)

This relationship is visible in Figure 1 above, where there does happen to be high correlation, but the substantial increase in correlation is the point of note. It can be seen around 1990 that Chile started making headways in FDI Outflows. To further dive into this occurrence, we take the Pearson product moment correlation coefficient over time between FDI Inflows and FDI Outflows, using a periodic rolling window of five years, shown in Figure 2 below.

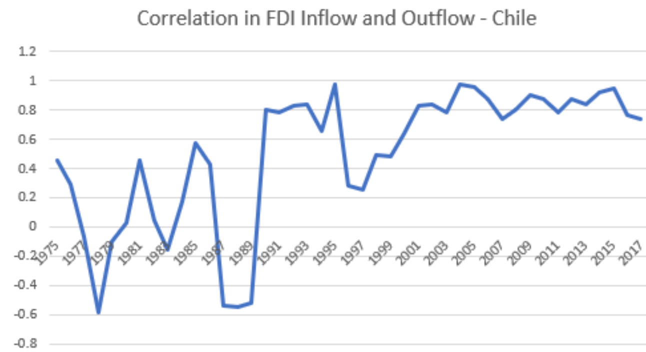

FIGURE 2 - CHILE FDI INFLOWS AND OUTFLOWS CORRELATION

The correlation shows a significant upswing in 1990. In addition, the volatility of the correlation clearly stabilized from that moment onwards, as can be seen in Figure 3 below. It is important to point out that this is not a signal of market integration, as much as it is an effect of integration. What it does help define, however, is a potential timeline of when market integration took place in Chile. This information, along with the dates obtained from subsequent Stage 2 filtering will give a clear timeline for all the countries that have achieved market integration out of the sample, allowing for a target when attempting to discover leading indicators of integration.

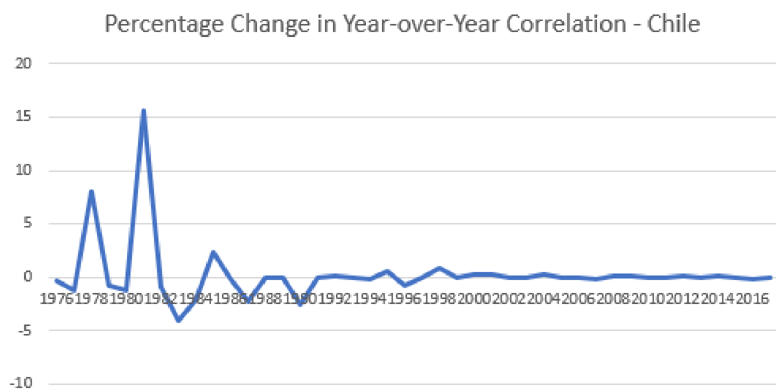

FIGURE 3 - CHILE FDI INFLOW AND OUTFLOW, YoY PERCENT CHANGE IN CORRELATION

Figure 3 depicts the yearly percent change in correlation between FDI inflows and outflows. This can be seen as a basic indicator of the volatility in correlations, and as shown, it falls to near-zero levels in 1990 and stays there until the present.

These same steps are then repeated for the remaining countries in order to obtain a year of integration in terms of FDI inflows and outflows. It is important to note that any one category may not always result in a clear answer. For this reason, it is critical to perform all the categories of the Stage 2 Filtering to develop an overall picture and receive an integration date via each of the different macroeconomic variables.

Real Interest Rates

Real interest rates are a measure of the risk-free rate of a country, adjusted for expected inflation via the GDP deflator. Inflation can vary by country based on economic, political, and social factors, thus, real interest rates provide a comparable figure which accurately depict investment risks within a country. The approach to real interest rate analysis is similar to the one taken for FDI Inflow and Outflow. The main difference in this case is the comparison now comes with respect to the real interest rate of the United States. The US is chosen as a control due to the fact that the US Treasury market is one of the most liquid in the world. For this reason, it has the potential to depict the state of risk and return within the global economy. As correlation with the US real interest rate increases for any emerging market economy, it can signify that the risk profile of that country slowly starts to align with more developed world economies.

Previous literature on market integration states that expected return should decrease when a country moves closer to integration. As a country becomes more tied to the world economy, it comes with greater liquidity, investment opportunities, and overall economic health [3]. These factors lead to lowering investment risk within the country, and of course lower risk means lower returns. In the analysis of real interest rates, this pattern becomes apparent as well.

Using Indonesia as an example, Figure 4 below shows a graph of the real interest rate of Indonesia against that of the United States as well as the correlation between the two over time, taken using five-year rolling periods. When analyzing the graph of rates, 2003 seems to be the beginning of a period of steadily declining and then stabilizing rates. For this reason, it can be taken as a turning point in the analysis. The expectation is that from 2003 onwards, the correlation of interest rates will have a marked increase compared to what it was in the past. However, when looking at Figure 4, quite a different story is painted.

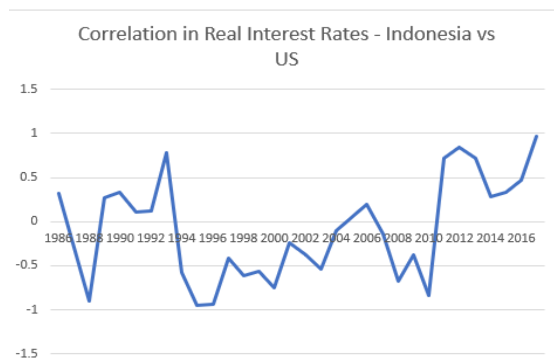

FIGURE 4 - REAL INTEREST RATES - INDONESIA vs UNITED STATES AND THEIR CORRELATION

Figure 4 does not show a clear increase in correlation as expected. In fact the peak correlation does not come anywhere near 2003, it comes later in 2012. For this reason, further analysis of these numbers is needed to see the true impact of market integration in relation to real interest rates. Figure 5.1 and 5.2 below provide details to give a better understanding of the effects of integration. Before diving into it, a possible explanation for the volatility in Indonesia's real interest rate could be inflation volatility rather than risk volatility, as accounted for in the hypothesis. This would signify volatile price movements in the country, especially in commodities prices which could be caused by an underdeveloped trade infrastructure as import and export values vary widely with supply and demand. In the end, though, high inflation volatility could also be a sign that a country has not reached market integration. So, whether interest rate volatility is caused by a country's risk profile or its inflation rate, a more stable real interest rate would be a sign of market integration either way. For this reason, even if inflation volatility is driving low correlation between the Indonesia and US interest rates, a stabilization of Indonesia's rate would be a sign of market integration regardless of what it is caused by.

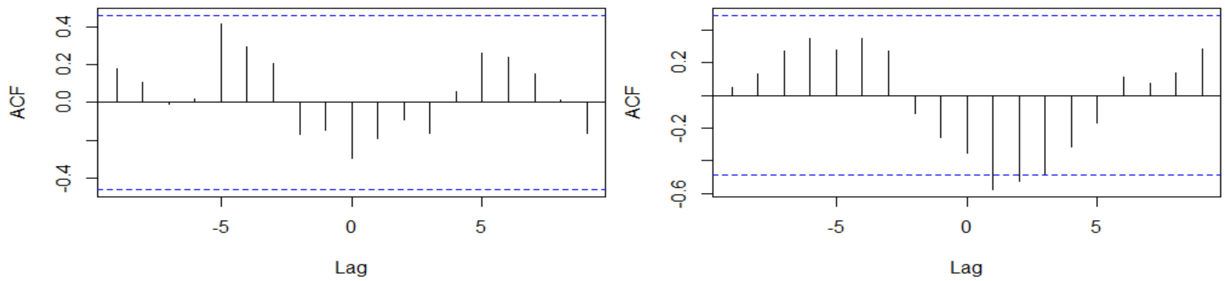

FIGURE 5 - CROSS-CORRELATION OF INDONESIA vs UNITED STATES REAL INTEREST RATES: 1986-2003 AND POST 2004

The two graphs depict a Cross-Correlation Function (ccf), obtained using R, for the Indonesia vs US Real Interest Rate data. The cross-correlation function in R estimates the correlation in two vectors: x_{t+k} and y_t. The k signifies the time lag in x that is being correlated with y. In order to find k, the function continually increments it by one value and returns the k value where the correlation is highest or lowest. As the correlation increases closer to k=0, it means greater real-time correlation between the two time series. In the two graphs in Figure 5, the k values are on the x-axis, while the correlation at each k value is on the y-axis. The y-axis, although labeled as ACF, or Auto-Correlation, is truly the cross-correlation. The incorrect labelling comes from a technicality within R where the ccf() function is created using a variation of the acf() function, resulting in the incorrect label. From the years 1986-2003, in the first graph, it appears that the Indonesia real interest rate lags the US interest rate, so if the US rate moves, the Indonesian rate will also move, but with a delay. This delay explains the lack of correlation in the original graph shown in Figure 4 since that shows the real-time Pearson Product Moment Correlation. Furthermore, as seen in the second graph, from 2004 onwards, correlation is significantly higher as the lag, or k value, gets to 0, which signifies a near real-time correlation between the two interest rates, giving us a likely time for market integration.

Continuing along these lines provides a timeline of integration by real interest rates for most of the other countries in the sample, with a few inconclusive. The final results obtained are discussed at the end of this section.

GDP Growth Rates

Real GDP growth provides a measure of economic growth for a country. The World Bank defines GDP as the sum of gross value added by all domestic producers, with select adjustments for product taxes and subsidies not already included in the value of the products. In this analysis, the growth rates of each country are compared to the average real GDP growth of all G-7 countries.

Upon initial analysis, GDP growth did not show any type of trend that could be analyzed across all countries. The only similarity that appears to prevail across the board is the high level of volatility in GDP growth, especially in comparison to the G-7 average. Along those lines, a hypothesis is that a country nears market integration during the time GDP growth starts to stabilize and become less volatile. The first step to test this is to remove outliers; during periods of recession, for example, GDP growth falls to uncharacteristically low levels which can result in falsely increasing volatility.

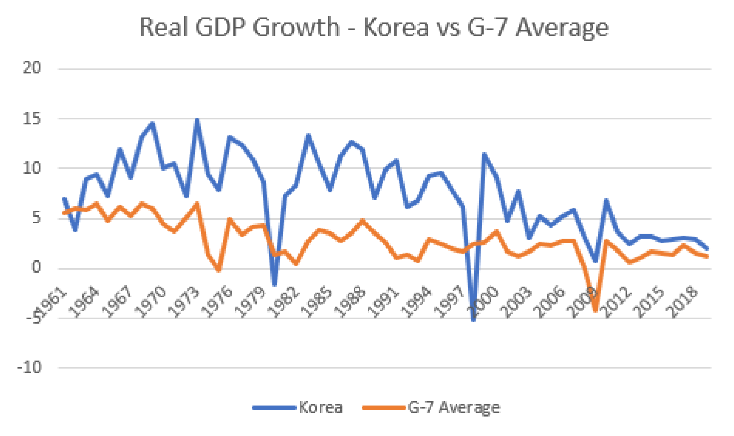

FIGURE 6 - REAL GDP GROWTH OF KOREA vs THE G-7 AVG

As shown in Figure 6, Korea has two points where GDP growth drops to an extreme low. The first, in 1980, is due to the second oil crisis from 1979 caused by the Iranian revolution. This led to a period of mass inflation, which impacted the Korean economy for a few years [9]. The second occurrence is at the end of the 20th century due to the 1997-98 Korean financial crisis [11]. Upon further review, only one of these points is found to be an outlier: the one in 1998. The outlier is obtained by first finding the quartile 1 (Q1) and 3 (Q3) values. The difference of these became the interquartile range (IQR). The lower limit of the data is equal to Q1 - (1.5*IQR) and the upper limit is Q3 + (1.5*IQR). The updated graph is shown in Figure 7 below.

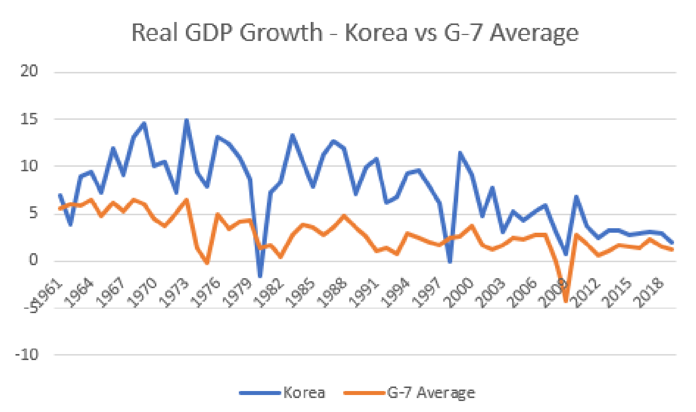

FIGURE 7 - REAL GDP GROWTH OF KOREA vs THE G-7 AVG, OUTLIER-ADJUSTED

Now that outliers have been removed, volatility can be measured more accurately. The purpose of this analysis is to figure out a timeline of integration, so for that reason, volatility has to be measured over time. Standard deviation is used to measure macroeconomic volatility, as described by Cariolle [6]. The standard deviation of the GDP growth rate is taken over five year rolling periods to obtain a measure for volatility over time.

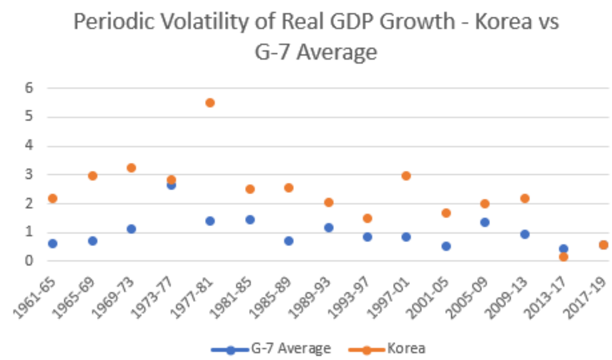

FIGURE 8 - PERIODIC VOLATILITY OF REAL GDP GROWTH - KOREA vs G-7 AVG

A couple points of note arise from looking at the graph. The first is that although volatility never truly falls to equivalent levels of the G-7, it does decrease to similar levels. It is in the 1981-85 era when the GDP growth appears to stabilize for the next few periods. The other point of interest ties to the volatilities in Figure 8, it can be seen that in the periods leading up to 1981-85, Korean volatility is on an upwards trend. It peaked dramatically in 1977-81, but that can be attributed to the second oil crisis of 1979. Then, after the predicted integration in 1981-85, volatility began to decrease and in fact started moving more in line with that of the G-7 countries. For this reason, 1981-85 appears to be a reasonable timeframe for the market integration of the Korean economy by way of GDP growth.

What seems to occur in terms of GDP growth can seem a bit counterintuitive at first glance: as GDP growth falls, a country gets closer to market integration. The true way to conceptualize this is that a country can only grow at relatively faster rates for a certain period of time before it reaches a peak and starts to align with the growth rate of more developed countries. This decrease in GDP growth rate and its volatility is not a negative sign, so much so a sign that a country's speed of economic growth has reached its saturation point and has begun stabilizing.

This same approach to analyze GDP growth rate volatility is applied for the remaining countries in the sample to obtain a timeline of integration in terms of GDP growth.

Debt Service on External Debt, Public & Publicly Guaranteed

Debt service on external debt defines the level of payments, both principal and interest, that a country must make on its public and publicly guaranteed loans. The metric used is more specifically for long-term obligations. The World Bank database provides these numbers in terms of USD, and for a more comparable measure, we look at the Debt/GDP. It also becomes an effective proxy for the Debt-GDP ratio of a country, but still a proxy since short-term debt is not included. An analysis of this metric can be done using insights gained from two of the previous metrics analyzed: Real Interest Rates and Real GDP Growth Rates. Both these metrics tie into debt service, interest rates because it helps determine levels of coupons being paid out and GDP growth rates due to the fact that we are analyzing the figures as a share of nominal GDP. Although the GDP growth rate is real and the GDP being used as a denominator is nominal, this does not present a glaring error in the analysis for a few reasons. One, inflation is being analyzed through real interest rates, as will be shown below. Second, only trends in GDP growth are being looked at, and these will be present regardless of inflation.

While analyzing real interest rates, we found that a period of rates becoming more stable shows a sign of market integration. For GDP growth, we found that it rises in the years leading up to integration and then experiences a short decline before stabilizing. This is a point of special interest; if GDP growth, and hence GDP, rises in the years prior to integration, it would only follow that debt service as a percentage of GDP would thus experience a decrease in the years leading up to integration, given no change in fiscal policy.

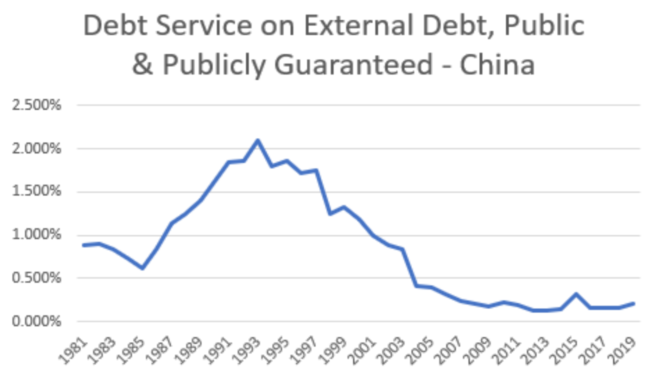

FIGURE 9 - CHINA DEBT SERVICE ON EXT. DEBT, PPG (% OF GDP)

Figure 9 shows that one out of the two conditions are clearly met. China experiences a significant decrease in debt service followed by an eventual stabilization of debt. The decrease appears to begin around 1994, eventually trailing off in the early 2000s, close to 2004. This seems to be enough evidence to dive further into the numbers. Figure 10 below shows China's Real GDP growth over time and its volatility, as measured by the standard deviation over five-year rolling periods.

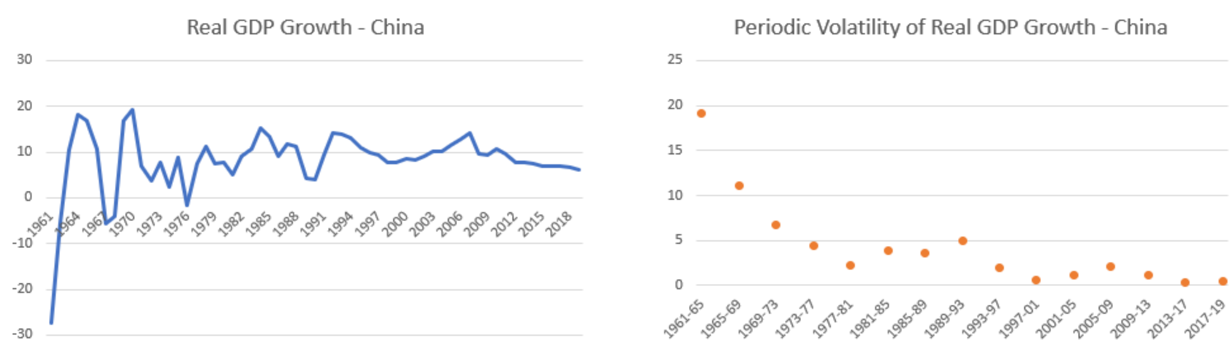

FIGURE 10 - CHINA'S REAL GDP GROWTH AND VOLATILITY

In line with the finding around GDP growth, China's GDP growth and its volatility appears to rise starting in 1991, followed by a fall and stabilization starting in 1994. Comparing this to the graph in Figure 9 of debt service, it has a brief peak right before 1994, then begins to decrease. So, based on the metric of GDP growth, it appears that sometime between 1994-2004 is when market integration occurs for China. In order to narrow it down even further, we will shift attention to interest rates to see how the interest component of debt service changes.

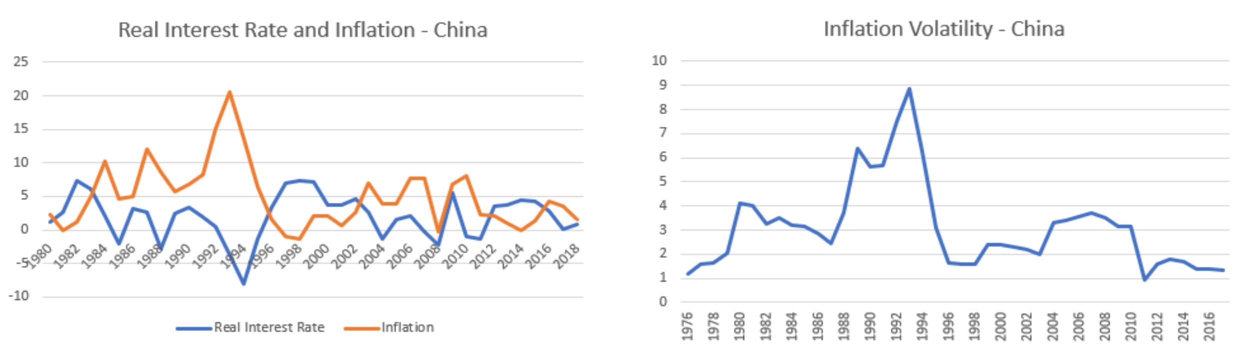

FIGURE 11 - CHINA REAL INTEREST RATE OVERLAYED WITH INFLATION AND INFLATION VOLATILITY

Figure 11 provides a picture of China's nominal interest rate by overlaying real interest rate with inflation. The inflation statistics are obtained from the World Bank database and are based on the GDP deflator. Similarly, the real interest rate is the lending rate adjusted for inflation measured by the GDP deflator. Looking at the first graph, around 2000, we can witness a relative stabilization of the inflation rate, and in fact from that period, inflation appears to move much closer in line with the real interest rate as well, with a brief trough and period of stabilization in 2000. This is clearly visible when looking at the second graph of inflation volatility. The volatility is obtained by taking the standard deviation over time using five-year rolling periods. As shown, inflation volatility sharply decreases starting in 1993 and then stabilizes around 1998. Tying all this back to debt service, we had obtained 1994-2004 as the year of integration because debt service was continually decreasing in that range before stabilizing. Now, when looking at real interest rates and inflation, we get a narrower time frame of integration, allowing 2000 to be a reliable year to believe market integration occurred for the Chinese economy.

This process is repeated for the remaining countries in the sample to obtain a final timeline of integration in terms of Debt Service on External Debt, Public and Publicly Guaranteed.

Portfolio Equity, Net Inflows

According to the World Bank database, net inflows to portfolio equity includes all investments made toward shares of equity securities, including depository receipts. The World Bank database provides these figures in terms of USD. In order to make it more comparable across countries, however, the number was divided by nominal GDP to put it in terms of a percentage to GDP. As one of the most active stock markets in the world, a logical choice to use as a control to compare against is the US market. So, the portfolio equity inflows of each country, as shares of nominal GDP, get graphed against the US portfolio equity inflows for the same time period.

As stated in previous literature on the topic, a trend that seems to occur at the time of financial integration is that investors start to adjust their portfolios more aggressively to hold larger amounts of equity investments [12]. Their (Kim and Lee) research was done specifically in relation to country-based mutual funds, but the assumption can be made that it will be present in some form across institutional investors. A country fund is typically a mutual fund which invests only in the securities of one country. By analyzing numerous different country funds, Kim and Lee noticed the pattern of portfolio adjustment across a number of host countries, providing the theory with more credibility. In addition, the very definition of market integration aligns with increased access to investments and more capital market activity coming from investors. With that in mind, the hypothesis going into analysis is that portfolio equities are seen to increase around the time of market integration, and it can be followed by increased correlation with US portfolio equity inflows.

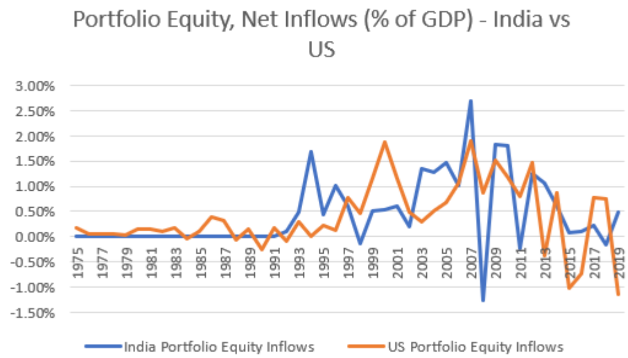

FIGURE 12 - PORTFOLIO EQUITY, NET INFLOWS (% OF GDP) - INDIA vs US

Figure 12 displays the net portfolio equity inflows of India compared to those of the United States. The Indian data do not begin until 1991, and then a significant uptick is visible in 2003. Going by the hypothesis that portfolio equity inflows increase at the time of market integration due to more equity-focused investment strategies, 2003 seems like the year of expected integration to do further analysis by. Diving deeper into that time period, Figure 13 shows a graph of the correlation between the portfolio equity inflows (as % of GDP) of India and US from 1991 to 2012.

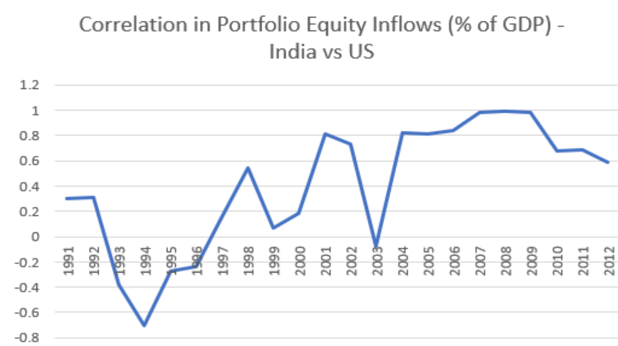

FIGURE 13 - CORRELATION IN EQUITY INFLOWS OF INDIA vs US

In 2003, the year of expected integration, correlation dropped to an extreme low. When connecting this to the hypothesis that integration is aligned with aggressive portfolio rebalancing, this does make sense. India saw an influx of portfolio equity inflows in 2003 which would not be reciprocated by the US and other developed countries. For this reason, correlation would be expected to drop at that time period. In the years preceding 2003, correlation is quite volatile, and in the years following 2003, correlation is seen to increase to levels far above where it was previously. This also aligns with the part of the hypothesis that correlation will increase post-integration.

As with the other methods of filtering in stage 2, this same process is repeated with the remaining countries in the sample, which leads us to our final results for all countries, presented in Subsection F.

Final Timeline

Now that all the metrics of Stage 2 filtering have been measured for each country in the sample, it has provided us with a final timeline to achieve international market integration for all 14 countries, as shown below in Figure 14. The timeline provides a range of years that market integration is predicted to have taken place. This will allow us to search for leading indicators in the years preceding the range of market integration.

Year of Market Integration By:	FDI Inflows/Outflows	Real Interest Rates	GDP Growth	Debt Service	Portfolio Inflows
Brazil			1982		2000
Chile	1990	2000	2000	N/A	2003
China	2014	2000	1994	2000	1997
Colombia	2000	2000	1991		
India	2002	2000	1991	2005	2003
Indonesia	2002	2004	2003	2004	2005
Korea	1977	2000	1981	N/A	1977
Mexico		1998	2001	2000	
Peru					
Philippines		2002			
Russia	1992		1999	1998	1994
South Africa	1991	1988	1985	1990	2010
Thailand	2010	1990		2004	2003
Turkey					

FIGURE 14 - TIMELINE OF INTEGRATION - ALL COUNTRIES

The countries highlighted in green are those that are believed, based on the results of the Stage 2 filtering, to have achieved market integration. The criteria used is that there has to be a conclusive date of integration by at least four out of the five metrics. Any cell labelled as N/A means that there was not any data present for that country/metric. An important point to note is that it is possible for any of the countries not selected to have reached market integration. Only five macroeconomic metrics were analyzed over the course of this research and they may not paint a complete picture of a country's economic status. However, the five metrics selected do span over a broad category of information, ranging from the flow of capital to debt and equity markets. For that reason, the metrics do provide a reasonable estimate of market integration and will be relied upon for determining leading indicators.

In Section V, we will analyze numerous data points, specifically looking at the years closely preceding the range of market integration, in order to find leading indicators that could predict imminent integration. Before that, however, we must look at dates in the timeline which do not align with each other and verify that it is not the mistake of the research and can be rationalized, as shown in Subsection G below.

Analyzing Discrepancies

Looking at the timeline in Figure 14, it is clear that some countries have an inexplicably wide range of years for market integration to have taken place. This is not to say that market integration is a fast occurrence; the process for integration, with infrastructure development and public policy creation likely started decades before our analysis even begins. However, when looking at each country through the five metrics we have selected, there is generally a similar timeline of integration for most of them, leading us to question the few discrepancies scattered throughout. We have labelled a discrepancy as a year that is over ten years before or after the average year of integration, measured by the arithmetic average of the four or five years obtained. Discrepancies have been highlighted in yellow in Figure 15 below. We now need to go through the relevant metrics and try to understand the reason behind each discrepancy.

Year of Market Integration By:	FDI Inflows/Outflows	Real Interest Rates	GDP Growth	Debt Service	Portfolio Inflows
Brazil			1982		2000
Chile	1990	2000	2000	N/A	2003
China	2014	2000	1994	2000	1997
Colombia	2000	2000	1991		
India	2002	2000	1991	2005	2003
Indonesia	2002	2004	2003	2004	2005
Korea	1977	2000	1981	N/A	1977
Mexico		1998	2001	2000	
Peru					
Philippines		2002			
Russia	1992		1999	1998	1994
South Africa	1991	1988	1985	1990	2010
Thailand	2010	1990		2004	2003
Turkey					

FIGURE 15 - FINAL LIST OF MARKET INTEGRATION, DISCREPANCIES HIGHLIGHTED

China

Starting with FDI, China appears to have a relatively late integration based on its Net FDI Inflow and Outflow. The discussion of FDI led us to conclude that once correlation starts to increase between inflow and outflow is when a country can be expected to have reached market integration.

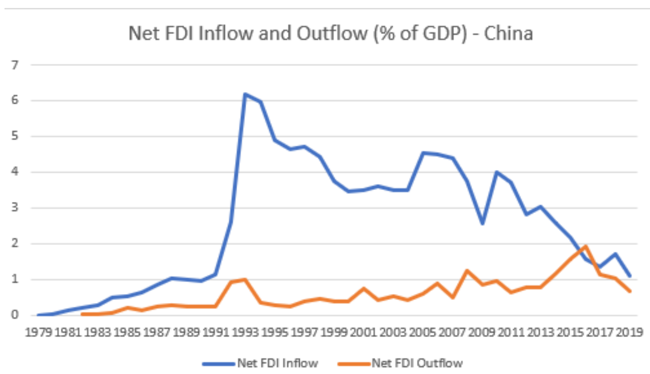

FIGURE 16 - CHINA NET FDI INFLOW & OUTFLOW (% OF GDP)

Figure 16 paints a strange picture, though, as China's FDI outflow was much lower than FDI inflows until very recently and correlation was little to none. Upon conducting further research, it appears that there are two reasons for this occurrence: governmental control of FDI outflows and especially high levels of FDI inflows. China did not institute it's open-door policy until 1979, which explains why the statistics do not even begin until then. Even then, however, most outward FDI activities were conducted by centrally controlled state-owned enterprises. In addition, much of China's investment activities were politically motivated rather than commercially, and in fact a large share of investments were made into Hong Kong rather than other countries [5]. Shifting attention to FDI inflows, China very quickly became a strong investment for the rest of the world. In fact China became the largest recipient of FDI among developing economies for the first time in 1993 and stayed in the top 5 for around the next 10 years, a result of its high investment potential [7]. With that, it is safe to say that China's 2014 date of integration is an explainable anomaly, and can be ignored. The remaining non-discrepancy years will be used instead.

Korea

Korea's discrepancy in real interest rates is very explicable as there simply was not sufficient data going back to the 1970s for that metric.

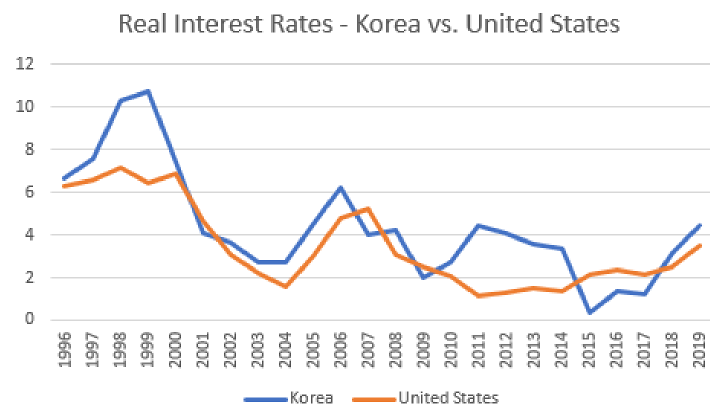

FIGURE 17 - REAL INTEREST RATES KOREA vs US

Figure 17 shows that the data starts in 1996, and even there, the interest rate lines up very quickly with that of the United States. Seeing as the remaining metrics provided consistent results, it is reasonable to assume that real interest rates would have done the same had there been sufficient data. The timeline provided by the remaining metrics will be used.

South Africa

South Africa presents an interesting case of political turmoil affecting its economic outlook. The main reason for the discrepancy is the existence of apartheid in the country until the end of the 20th century.

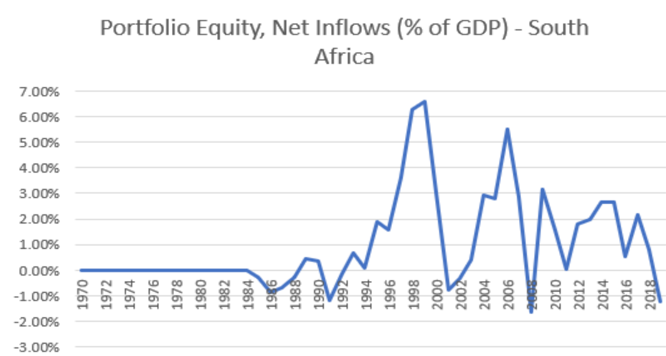

FIGURE 18 - SOUTH AFRICA PORTFOLIO EQ INFLOWS (% OF GDP)

Figure 18 shows that portfolio equity inflows in South Africa did not even begin until 1990. When Apartheid ended in 1994, a huge spike in inflows can be seen, much due to the fact that many countries were refraining from investing in South Africa before then due to apartheid [16]. It is safe to say that if not for this political strife, South Africa would have a more reliable date of integration in line with the remaining metrics and, for that reason, the date by portfolio inflows can be ignored.

Thailand

Thailand's discrepancy in real interest rates can be explained via the currency peg the country had placed to the US dollar prior to 1997. Although a currency peg has a direct effect mainly on exchange rates, it can have an indirect effect on interest rates as well, which would explain the premature correlation of interest rates between the two countries [4]. This indirect effect comes from a couple different sources, one of which is the potential for capital markets arbitrage. Since a currency peg ties exchange rates of two countries to each other, if the interest rates of the countries are markedly different, capital will flow into the higher interest rate country, eventually decreasing it to even the two out. Similarly, interest rates can be used to defend the currency and adjust for increases and decreases in inflation. It is important to note that other countries in the sample also had a peg on USD, such as Brazil and Indonesia, but there was not a marked effect on the metrics for those countries as visible here with Thailand in Figure 19. Since Thailand's currency was pegged to the United States, it caused an increased correlation in the two interest rates.

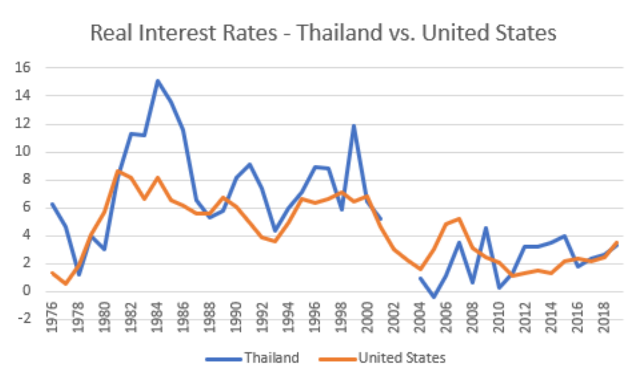

FIGURE 19 - REAL INTEREST RATES THAILAND vs US

Another point of note which can potentially explain the discrepancy is that there is a gap in the data from 2000-2002, as visible in the graph. This is especially unfortunate because that is around the same time period that the other metrics predicted integration, so it is quite possible that if there were sufficient data, a different picture may have been painted. In the end, though, there is enough evidence to dismiss the discrepancy and Thailand's timeline of integration can be taken from the remaining legitimate metrics.

Results

After analyzing discrepancies to ensure they are not the fault of the filtering process, a final timeline of integration is created (as seen in Figure 20) for the eight countries in the sample for which we were able to obtain clear dates of integration from four out of the five metrics. The timeline is created by obtaining the average year of integration based on each applicable metric and then creating a six year horizon of three years preceding and following that average year.

Country	Timeline of Market Integration
Chile	1995-2001
China	1995-2001
India	1997-2003
Indonesia	2001-2007
Korea	1975-1981
Russia	1993-1999
South Africa	1986-1992
Thailand	2003-2009

FIGURE 20 - FINAL TIMELINE OF MARKET INTEGRATION

These eight countries will now be analyzed in the final step of the research to obtain potential leading indicators of market integration.

DETERMINATION OF LEADING INDICATORS OF MARKET INTEGRATION

The original sample of 25 countries obtained from the sampling methodology outlined in Section II has now been narrowed down to eight countries that have a definite timeline of integration according to the filtering process outlined in Sections III and IV. This allows us to move forward with the research to determine any ex-ante indicators of integration which are common across a majority of countries. The key goal of this is to obtain potential metrics that can be analyzed for emerging markets going forward that will provide signals of the upcoming market integration for that country before it occurs.

We have determined that macroeconomic and financial metrics, such as those analyzed in the Stage Two Filtering are ex-post indicators of integration and are thus used to decipher when integration happened rather than predict when it will occur. In this section, we will analyze a select group of what we call human metrics, that are representative of social factors within the country that can be used to anticipate a country's market integration.

The metrics analyzed are Patent Applications, Urban Population, Gross Savings, Energy Use, Infant Mortality, and Life Expectancy. These specific metrics were selected for two reasons: availability of data and wide coverage of different topics. Availability of data primarily signifies which data points extend to before each country's integration time range. Wide coverage deals with the fact that each data metric addresses a different part of the overall health of a country and its people. For example, patent applications revolve around productivity while infant mortality depicts the healthcare infrastructure of a country.

When conducting analysis, it can be assumed that a pattern visible in all of the countries in the sample may occur for little to none of the metrics. For this reason, for each metric, if a pattern is visible in 75% of the countries (i.e 6 out of 8), then this pattern can be judged an accurate leading indicator of market integration.

Patent Applications

Patent applications within a country provide a unique look into the mindset of innovation of the population. This provides a number of important insights. First, assuming innovation is tied to education, it speaks to the level of education within a country. Second, innovation is an extremely broad term, and can signal an advancement in any number of fields (essentially whatever impact a patent may have), and for this reason, patent applications can be taken as a measure of development within a country.

The metrics obtained from the World Bank Data Bank define patent applications as worldwide applications filed through the Patent Cooperation Treaty procedure or with a national patent office for exclusive rights for an invention. These statistics are in turn obtained from the World Intellectual Property Organization (WIPO)

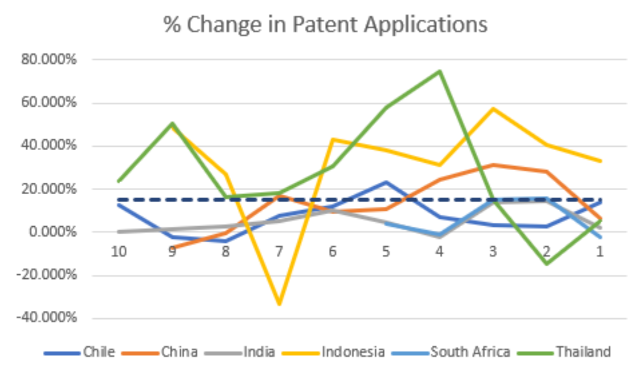

FIGURE 21 - PERCENT CHANGE IN PATENT APPLICATIONS (2-YR MOVING AVG) - 10 YRS PRIOR TO INTEGRATION RANGE

When analyzing patent applications, the numbers vary so widely across countries, it is difficult to immediately visualize a pattern. For example, in 1985, China had 4,065 patent applications while Indonesia had just 49. For this reason, a more useful metric is provided by the speed of applications, or the percentage change year-over-year. In order to reduce volatility, we turned this into a two-year moving average of the percentage change, and immediately a potential leading indicator becomes visible. Figure 21 shows a graph of the metric for all countries excluding Korea and Russia, for which sufficient data is not available. In the chart, 15% has been marked with a dashed line as it appears to be a cornerstone value. In the 10 years prior to integration, each of the countries experiences at least 2 consecutive periods of 15% or higher growth in patent applications within 10 years prior to integration, typically followed by a decrease.

It is not just enough to see a pattern, the pattern must also be explicable. A possible explanation is that in the years prior to integration, a country experiences a saturation of innovation, which is not sustainable (nor is it meant to be), but the fact that it occurs is important. This can improve the economy from numerous angles, including global competitiveness. financial systems. quality of life. employment. and openness to trade [15]. This saturation eventually subsides as a country nears integration, but its occurrence signals a period of far-reaching national growth and development.

Urban Population

Urbanization is a natural occurrence in any country as it grows and develops. The metric analyzed in this section is each country's urban population as a percentage of the total population, making it a standardized unit. The World Bank defines urban areas using data obtained from national statistical offices and the data were originally collected and smoothed by the United Nations Population Division.

There are many difficulties which come with increasing urbanization, including water scarcity and lack of sanitation and hygiene [13]. This is not necessarily a negative, though, as it forces a country to improve its infrastructure and federal policies, both of which can increase the likelihood of market integration. Furthermore, as a country's urban population grows, it provides more of the nation's people with access to utilities like electricity and consistent Internet [10]. This allows for a more efficient use of human resources as well as a better education of the population. For these reasons, analyzing a country's urban population is critical to understanding the development of a country and when market integration may occur.

Years Before Integration Range	20	15	10	5	0
Chile	78.39%	81.24%	82.62%	83.27%	84.55%
China	17.40%	19.36%	22.87%	26.44%	30.96%
India	22.03%	23.65%	24.82%	25.98%	27.03%
Indonesia	22.82%	26.95%	31.61%	37.24%	42.78%
Korea		27.71%	32.35%	40.70%	48.03%
Russia	64.87%	68.70%	71.07%	73.18%	73.38%
South Africa	47.36%	47.87%	48.17%	48.59%	49.91%
Thailand	27.57%	28.90%	29.93%	30.80%	34.94%

FIGURE 22 - URBAN POPULATION (% OF TOTAL)

For each of the countries, we looked at the urban population 20, 15, 10, and 5 years before the start of the integration range, as shown in Figure 22. There does not appear to be a clear pattern visible immediately that can leave us with a tangible signal of integration, so we break it down in an index method. This takes 20 years before integration as the base point and analyzes the growth in urban population relative to where it started (20 years before integration). This chart is displayed in Figure 23.

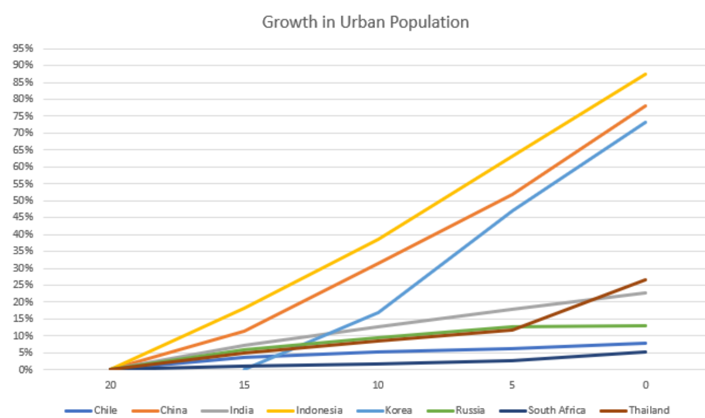

FIGURE 23 - GROWTH IN URBAN POPULATION

Now this tells a more meaningful story. However, the issue is that there appear to be a couple different stories being told. Half of the countries seem to be approaching a horizontal asymptote, which could mean a maximum level of urban population. However, Indonesia, Korea, and China (The top 3 lines) do not fit the same rule and appear to be increasing non-stop. As outlined at the beginning of Section V, we need at least 6 out of the 8 countries to fit the pattern in order for the metric to be considered. We do not have that, and thus, Urban Population cannot be deemed a signal of market integration.

Gross Savings

Gross savings, as calculated by the World Bank Data Bank, is gross national income less total consumption, plus net transfers. In simpler terms, it is how much a population does not spend. The data analyzed is gross savings as a percentage of GDP to ensure the values are comparable across countries.

Gross savings can imply a few items of note. First, it can point to a more financially mature population which understands the importance of saving. Second, it can point to the wealth of a population as individuals have the lifestyle and ability to put aside income for savings. For these reasons, gross savings is an effective indicator of the social development of a country.

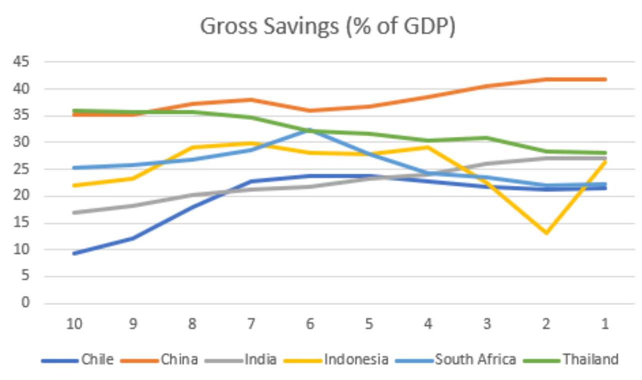

FIGURE 24 - GROSS SAVINGS (% OF GDP) - 10 YRS PRIOR TO INTEGRATION RANGE

Figure 24 shows a graph of the gross savings rates of each country going back 10 years prior to the beginning of the estimated integration range. Korea and Russia are not present here because the data does not extend far enough before their integration range to provide an effective analysis. Upon further analysis, a pattern came into view: at the beginning of the integration range, 7 out of the 8 countries had a savings rate that was between 20-30% of GDP.

	Savings Rate
Chile	24.23507466
China	39.53008296
India	27.55043249
Indonesia	27.19979393
Korea	25.54352993
Russia	29.57601975
South Africa	21.16022179
Thailand	27.97383939

	Reaches 27-29%
Chile	N/A
China	N/A
India	1 year before integration
Indonesia	7 years before integration
Korea	1 year before integration
Russia	1 year before integration
South Africa	5 years before integration
Thailand	2 years before integration

FIGURE 25 - GROSS SAVINGS (% OF GDP) - STARTING YR OF INTEGRATION RANGE || TIMELINE FOR THE SAVINGS RATE TOUCHING 27-29% OF GDP

The table on the left in Figure 25 shows the specific rate for each country, and as shown, all countries except China have a savings rate in between that range at the time of integration. Now, tying it into the finding on change in savings rate found earlier, the savings rate is generally decreasing (has a negative year over year change) in the years leading up to integration. For this reason, a hypothesis can be formed that if the savings rate is between 20-30% when integration begins (and 20-27% for most of the countries), then the rate may be 27-29% in the years leading up to integration and will then fall into the integration value. The second table in Figure 25 proves this hypothesis to be an accurate judge of integration as it can be seen that 6 out of the 8 countries touch a savings rate of 27-29% within 7 years prior to integration, effectively making it a leading indicator. Chile and China do not seem to fit the pattern, but 75% adoption proves enough to establish a conclusion.

So, gross savings has left us with a rather intuitive leading indicator, the savings rate itself, where it can be seen that when a country reaches 27-29% of gross savings (as % of GDP), it signifies an incoming market integration within 7 years or fewer, and based on the evidence, that number is more likely to be closer to 3 years, taking the average of all the values found in Figure 25.

Energy Use

Energy consumption has long been defined as a measure of productivity and development for a country. The data analyzed here is Energy Use in terms of kg of oil equivalent per capita. Since the data are on a per capita basis, it makes it comparable across countries. According to the World Bank definition of the metric, energy use refers to use of primary energy before transformation to other end-use fuels.

Past literature has consistently come up with a positive relationship between energy consumption and financial development [8]. Even when analyzing the data for the countries in the sample, energy use is consistently increasing with no visible inflection points as are present in the previous leading indicators. For this reason, we are more concerned with the rate of change itself rather than its direction.

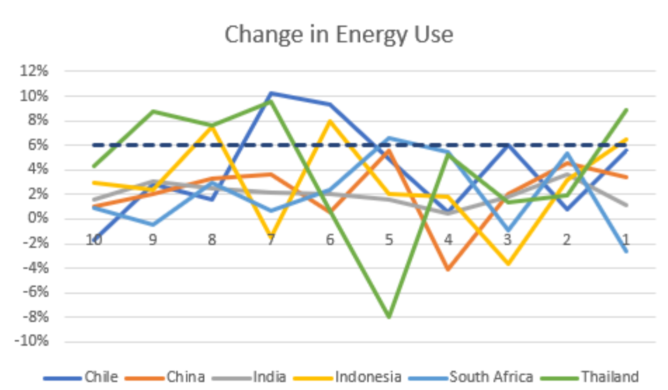

FIGURE 26 - PERCENT CHANGE IN ENERGY USE (KG OF OIL EQUIVALENT PER CAPITA) - 10 YRS PRIOR TO INTEGRATION

We noticed, as shown in Figure 26, that 5 out of the 6 countries (not enough data for Korea/Russia) reached a relatively high percentage change in energy use of at least 6% within 10 years prior to integration. The reason this finding can be significant is based on analyzing the same energy usage metrics for the developed G-7 countries. Upon taking the average values of the G-7 countries, it is clear that substantial changes in energy use are not as common as in developing countries. The G-7 countries, from 1971-2019, have an average year-over-year percentage change of 0% and a maximum percentage change of 3%. For developed countries, decreases in energy use are as common as increases and there are relatively low deviations from the mean compared to emerging markets. This provides much more context to the percentage change values for the countries in the sample, and 6% now appears to be a substantial enough change to define a leading indicator. This pattern takes even more meaning when looking back 10 more years back, so now going to 20 years before integration. As shown in Figure 27 below, only two of the countries reach that level of growth in energy use in this time period, making it a more solid signal of integration.

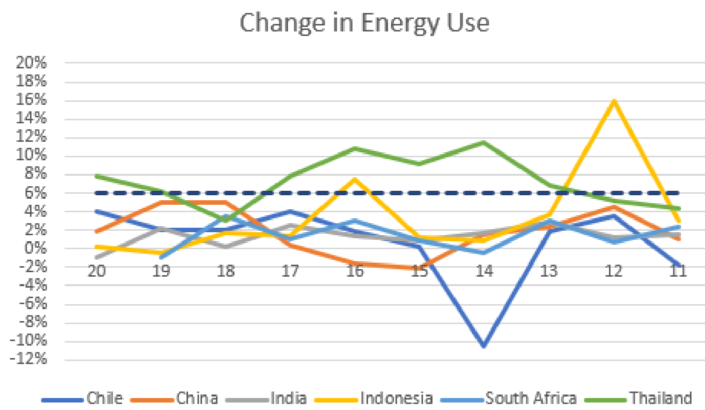

FIGURE 27 - PERCENT CHANGE IN ENERGY USE - 20 YRS PRIOR TO INTEGRATION RANGE

As shown it is relatively unlikely that a country touches a 6% increase in energy use more than 10 years prior to integration. Furthermore, based on the average change in energy use of the G-7 countries, it is extremely unlikely that a country gets close to that level once it reaches developed status. So, 6% growth in energy use can be taken as a signal that market integration will be occurring for a country within 10 years.

Infant Mortality

Infant mortality provides numerous important measures of social life within a country. It speaks towards the development of medical services and technology, sanitation services, standard of living, and overall socio-economic health of a country [14]. The metric we analyze is the number of deaths of infants within one year of living (per 1,000 live births). So, it is a measure of how many children died within one year for every 1,000 children who were born. The World Bank obtains these metrics using estimates developed by the UN Inter-agency Group for Child Mortality Estimation.

Upon initial analysis, we found that infant mortality rates are consistently decreasing in emerging markets. In a developed country like the United States, however, the average decrease in infant mortality is extremely minute at just 0.03%. This is due to the fact that infant deaths will never be fully eradicated. The infant mortality rate for the United States has been under 1% since 1988, slowly decreasing to just over 0.5%, where it is as of 2019. Infant mortality will exist in some form, no matter how small, and for this reason there is only so far it can decrease. For emerging market countries, however, as they are still developing and improving, change comes at a much more rapid pace, but of course starts to decrease as integration nears.

Continuing with this hypothesis, we decided to look at the infant mortality rate from 20 years prior to integration. The graph for this is shown below in Figure 28. South Africa has been removed as there is not enough data stretching prior to its integration range.

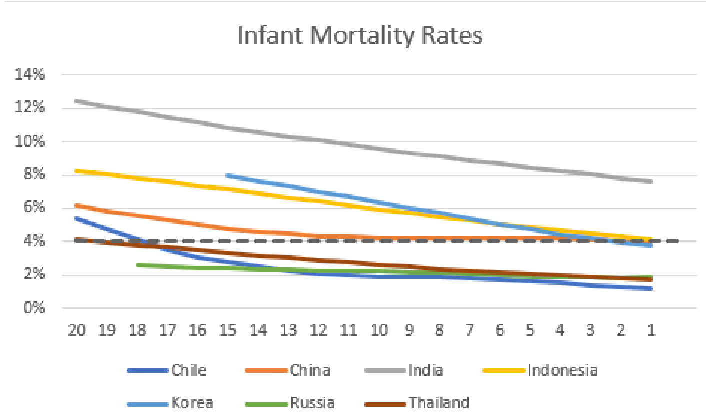

FIGURE 28 - INFANT MORTALITY RATES - 20 YRS PRIOR TO INTEGRATION RANGE

A line has been placed at 4% because this was found to be a commonality for each country. All but two countries cross that line in the years preceding integration. Unfortunately, the timeline here is much more spread out than found in previous leading indicators. Nevertheless, a pattern is visible wherein lies a potential signal for market integration. What seems to be happening is that infant mortality can no longer decrease at a rapid pace once a country becomes sufficiently advanced in terms of healthcare facilities. An easier way to think about it is that a country's health services start to reach peak potential, at which point infant mortality rates cannot get much lower, hence the year-to-year change in infant mortality becomes extremely low. For most integrated countries, the number of infant deaths for every 1,000 births is already below 100 deaths even 20 years prior to integration, there is not much room to improve from there.

Based on this analysis, when a country reaches an infant mortality rate of 4%, it can signify incoming market integration within 11 years, on average.

Life Expectancy

Life expectancy, similar to infant mortality, provides an effective indicator of a nation's health and development. In addition, the size and success of numerous industries depend on a population's life expectancy, including insurance, pharmaceuticals, and other health-care related industries [1]. The data obtained from the World Bank measure life expectancy at birth, meaning the number of years a newborn would live if current mortality patterns prevail. The data are sourced from 6 potential streams: United Nations Population Division, Census reports and other statistical publications from national statistical offices, Eurostat: Demographic Statistics, United Nations Statistical Division, U.S. Census Bureau: International Database, and Secretariat of the Pacific Community: Statistics and Demography Programme.

As the analysis continued, however, there did not appear to be a clear pattern that can turn into a discernible leading indicator. It is clear that life expectancy continually increases as a country progresses. However, there does not seem to be a particular age, or a growth rate of life expectancy that can signal incoming market integration.

CONCLUSION

Past literature has described numerous methodologies by which to date a country's market integration. This paper has served to expand on that through the Stage Two Filtering process; we have established numerous measures that when analyzed on aggregate, can identify a range of years when a country is predicted to have reached market integration. This is where the focal point of our research begins: with the discovery of various leading indicators. These indicators take place in the years prior to integration and display a pattern exhibited across at least 75% of countries used in the sample. For it to be a leading indicator, the pattern must have a rationale behind it, and the key leading indicators we have uncovered stem from patent applications, gross savings, energy usage, and infant mortality. These metrics have helped us uncover leading indicators that signal integration around 10 years before it occurs.

There are expansions upon this work which can grow the field of emerging market research. Starting with improving upon some of the drawbacks of this research, such as improving the science behind the leading indicators to create more advanced metrics and measure the timeline of integration more effectively. This would essentially mean being able to create a scale of integration or an estimation of how long until a country may integrate with the world economy.

From there, a natural step is to observe an emerging market country that has not yet reached integration and check for signs of these leading indicators. If the country follows the timeline of integration based on the leading indicators, it becomes a real-time verification of all the work done. Finally, the step to put everything together involves creating an investment strategy based upon the degree of integration a country is in. An investment strategy can be one of financial securities or physical assets within a country. For example, if analysis shows that a country will reach market integration within the coming 5-10 years, it would be useful to start obtaining physical assets in that market (land, buildings, commercial real estate) which would naturally experience capital appreciation in that time frame. Similarly, for financial securities, if a country is expected to integrate within the next 1-2 years, an investor could purchase equity securities of companies in that country due to the fact that, based on the research done, equity prices rise in the time leading up to market integration.

The study of social factors could lead to a new basis for forecasting the health of emerging markets, which would translate to sovereign yields and can impact both debt and equity prices. On the flip side, it can also point to countries which are overvalued in terms of their social development. In other words, it provides a means for matrix pricing for countries, using social factors as comparables rather than credit ratings.

Nevertheless, this paper takes the first step to creating this investment strategy by solidifying the timeline of a country's integration with the world economy.

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ABSTRACT

Student or collegiate chapters of college athletic booster clubs allow athletic departments to engage their current students and cultivate a possible longer-term donor relationship with them. A key motive for students to join a booster club is the ability to ensure access to tickets now and to improve their donor profile in the future. This manuscript examines the benefits offered by student chapters of athletic booster clubs today with the longer-term desire to develop the next generation of donors to support their programs well into the future.

INTRODUCTION

Marketers recognize that customer lifetime value (CLV) and the development of brand loyalty are pivotal to the success of brands and organizations. Rather than viewing today's transaction as an isolated event (i.e., a transaction focus), it is prudent to view customers with a lifetime value perspective (i.e., a relationship focus) as a foundation to a customer retention program [15]. Many collegiate athletic fundraising or booster clubs have operationalized this approach effectively and instituted the core elements of a customer relationship management (CRM) program into their membership programs [1].

Clemson University provides an excellent illustration of this strategy at work. In 1934, Clemson started a booster club to support its athletic programs. The program was named IPTAY, which originally stood for "I Pay Ten a Year." Today, IPTAY is one of the most successful athletic fundraising organizations in college athletics. IPTAY provides millions of dollars in support for student-athletes and non-student-athletes at Clemson University [8]. IPTAY provided $63.7 million in funding support in 2019 [10].

Currently, there are over 8,000 Clemson student members of the IPTAY Collegiate Chapter. The student club encourages Clemson's current students to join IPTAY to support their fellow students and to begin to earn points to enhance their donor status after graduation. IPTAY Collegiate Club members enjoy a number of benefits, including early access to football tickets, special entrance to basketball games, invitation to exclusive events, and many others [9].

The IPTAY benefit "earn priority points for your IPTAY membership after graduation" is a powerful illustration of today's students projecting themselves as 'future donors' to Clemson University and their desire to be pro-active in beginning to build their donor profile. This strategy is consistent with the best practice of athletic fundraisers targeting their current fan base for donations [16].

The purpose of this manuscript is to examine the activities of student chapters of college athletic booster programs. Specifically, a content analysis was conducted of the lists of benefits offered by such programs to identify the most common practices and to recognize innovative practices that may become more widely-used by increasing their awareness among athletic fundraising professionals. A discussion of some contextual variables that may influenced these student clubs is also provided.

THE VALUE OF STUDENT MEMBERSHIP

From a marketing standpoint, value is an evaluation of what a buyer gives and gets in return [6]. A buyer must perceive value in the benefits to be received to motivate them to participate in that exchange relationship [12]. Donors who feel valued by an organization tend to be more personally invested, which tends to lead to higher donor retention levels and increasing giving amounts [5]. Research on athletic donors suggests the primary motives driving donation include: supporting and improving the athletic program, receiving tickets, helping student-athletes, deriving entertainment and enjoyment, supporting and promoting the university (non-athletic programs), receiving membership benefits, repaying past benefits received, helping and enhancing the community, and psychological commitment [4]. Park et al. [14] found that donors in the low-contribution group tend to more motivated by tangible benefits to be received whereas donors in the high-contribution group tend to more motivated by the social opportunities and meeting other donors and other stakeholders.

Unlike donors in other non-profit organizations, an athletic donor's primary motivation may be more than philanthropic. Most athletic fundraising programs include a tiered reward system requiring higher levels of giving to obtain the most desired benefits (e g, tickets) [7] [13]. Membership guidelines may use both a transactional approach (e.g., this year's level of giving) and relational approach (e.g., lifetime giving amount and years of membership) to assign a donor's profile. To have access to the most exclusive member benefits such as premium seats or securing one of the finite number of visitor seats for an important road game, donors may be encouraged to 'join early' and 'donate often.' For example, a University of South Carolina fan must currently donate at least $3,500 per year just for the right to purchase premium seating in the football stadium (i.e., the transactional aspect) with more premium seats attached to higher donation levels and/or accumulated donor points (i.e., the relational aspect). Alternatively, a Gamecock fan must donate at least $10,500 per year for access to the Frank Maguire Club in Colonial Life Arena for a basketball game [3].

METHODOLOGY

A census of athletic department fundraising organizations in all Division I Football Bowl Series (FBS) institutions was conducted. The 10 FBS athletic conferences and a small number of independent schools combine for 130 total members. After reviewing the athletic websites of all institutions, 25 student clubs were identified for analysis. This illustrates that less than 20% (25/130 = 19%) of FBS schools operate separate student chapters of their athletic fundraising booster clubs. It is possible that some institutions offer a student membership in the organization but not a student chapter per se. At a minimum, such institutions are making it harder for their students (their prospective members) to connect with the club. A commitment to a student chapter is a tangible commitment to engage with current students and begin to develop a donor relationship with them.

Marketers can segment a market based on the benefits sought by their consumer [6]. Consumer have problems; marketers sell solutions or 'bundles of benefits.' These bundles of benefits offered by student athletic booster clubs served as the primary data collected in this study. These lists of benefits offered were evaluated and classified into the clusters that were revealed by the analysis.

RESULTS

The process of identifying student clubs for this study and their relative scarcity (i.e., over 80% of FBS schools do not have a separate student chapter of their athletic booster clubs) was the first notable finding in this study. Here's a list of the student clubs evaluated and their institutions and athletic conference:

- **ACC:** Clemson, NC State, UNC, Virginia Tech, Boston College, Florida State, Georgia Tech, Pittsburgh and Louisville (n=9)
- **SEC:** South Carolina, Auburn, LSU, Arkansas, and Texas A&M (n=5)
- **BIG 12:** Texas, TCU, Baylor, and Kansas (n=4)
- **American Athletic:** East Carolina, Central Florida (n=2)
- **Sun Belt Conference:** Appalachian State, Coastal Carolina (n=2)
- **PAC 12:** Arizona (n=1)
- **MAC:** Miami University (of Ohio) (n=1)
- **Mountain West:** Utah State (n=1)

Many athletic booster clubs lack a designated student membership option; however, the entry-level threshold for donations may provide many of the common benefits. One example is Kansas State University. For a $50 annual membership fee, members receive the following benefits [11]: Enhancing the Student-Athlete Experience; Season & Single Game Ticket Priority; Bowl & Post-Season Basketball Ticket Priority; Harley Day On-Field Participation; K-State Super Store Discount; Ahearn Fund Membership Card; Ahearn Fund Member Appreciation Day Invitation; Official Window Decal; FREE Ahearn Fund gift; Junior Wildcat Club Membership Discount; and Powercat Auction Invitation

These benefits are similar to the benefits packages of many student chapters but no separate student membership category is offered. The commitment to a student chapter is a tangible commitment to engage with current students and begin to develop a donor relationship with them.

Cost of Student Membership

All student clubs evaluated did include an annual donation for membership. Minimum annual donation amounts ranged from $15 (Georgia Tech) to $125 (Pittsburgh). However, it must be noted that Pittsburgh's $125 annual donation did include the purchase of student season tickets to football and men's basketball. After removing PITT from the analysis, the median student donation was $25 per year (e.g., middle value) with an average of $30 per year.

Most Common Benefit Categories

Eight 'clusters' of student member benefits were identified from the information presented on the fundraising organization websites. It must be noted that additional benefits may be offered but were not highlighted by the organization on their websites. The clusters are presented in rank-order with 1 being the most frequently cited benefit in student chapter promotional materials.

1. **Support Students:** Support your fellow students and institution.
2. **Member Points and Donor Profile:** Opportunity to earn membership points and build donor profile.
3. **Special Events:** Access to exclusive 'insider' events and experiences.
4. **Tickets or Ticketing Process:** Access to tickets (early access, regular season access, post-season access) or premium member seating.
5. **Merchandise:** Receive T-shirts, hats, swag, etc.

6. **Facilities:** Early access to facilities or dedicated entry-point for members.
7. **Information:** Access to information (newsletters, website).
8. **Discounts:** Access to consumer discounts at participating businesses.

The summary of each benefit cluster is provided in **Table 1**. The offering of that benefit by each student club is presented in **Table 2**.

Table 1: Profile of Benefit Clusters Identified

Benefit Cluster Number of Clubs Offering Benefit	Identified Patterned Examples
Support Students **100%** (25/25 clubs)	• "Support your fellow students" • "Be part of the team behind the team" • "Show your school pride"
Member Points and Donor Profile **92%** (23/25 clubs)	• Members earn points for yearly membership • Members may get 'extra credit points' while student members • Members begin building their donor profile in anticipation of post-graduation members and buying tickets in future seasons • Members can monetize their student membership. Points earned are akin to a $XXX donation to the athletic fund
Special Events **88%** (22/25 clubs)	• Members get 'insider' facility tours and behind-the-scene views • Members get invited to meet-and-greets with coaches, student-athletes, and the athletic director • Members get invited to tailgate parties or similar social events • Members get exclusive facility use (such as photo ops)
Tickets or Ticketing Process **80%** (20/25 clubs)	• Membership automatically includes tickets • Membership allows right to buy tickets • Members get right to buy tickets before others • Members get increased probability of being selected for tickets in any ticket lottery process • Members get right to buy tickets for post-season play • Members get right to buy tickets to away games • Members get access to special or dedicated seating section
Merchandise **72%** (18/25 clubs)	• Members get merchandise Now – T-shorts, hats, swag • Members gets merchandise Later – 4-year membership rewards (including graduation stole) • Members automatically registered in periodic raffles for merchandise
Facilities **48%** (12/25 clubs)	• Members get early access to facilities (to pick their seats) • Members get dedicated entrance to stadiums • Members get dedicated pick-up window for tickets
Information **28%** (7/25 clubs)	• Members get weekly email updates • Members get subscription to newsletters and other publications
Discounts **28%** (7/25 clubs)	• Members get discounted purchases at participating businesses • Some schools brand the program (such as UNC's Heals Deals)

Source: Original

Table 2: Summary of Benefits Offered per Student Club Evaluated

Institution	Support Students	Merchandise	Information	Tickets	Facilities	Special Events	Discounts	Member Points and Profile
Appalachian State	✓	✓		✓	✓	✓		✓
Arkansas	✓	✓		✓		✓		✓
Arizona	✓	✓		✓				✓
Auburn	✓					✓		✓
Baylor	✓		✓	✓				✓
Boston College	✓	✓		✓	✓	✓		✓
Central Florida	✓	✓	✓	✓	✓	✓		✓
Clemson	✓	✓	✓	✓	✓	✓	✓	✓
Coastal Carolina	✓	✓		✓		✓		✓
East Carolina	✓			✓		✓	✓	✓
Florida State	✓	✓		✓	✓	✓	✓	✓
Georgia Tech	✓			✓		✓		✓
Kansas	✓			✓		✓		✓
Louisville	✓	✓		✓	✓	✓		✓
LSU	✓			✓	✓	✓		✓
Miami (OH)	✓	✓		✓	✓	✓		
North Carolina	✓	✓	✓	✓		✓	✓	✓
N C State	✓	✓	✓	✓		✓		✓
PITT	✓	✓		✓		✓	✓	✓
South Carolina	✓	✓						✓
Texas	✓		✓	✓	✓	✓	✓	✓

Institution	Support Students	Merchandise	Information	Tickets	Facilities	Special Events	Discounts	Member Points and Profile
Texas Christian	✓	✓		✓	✓	✓		✓
Texas A&M	✓	✓	✓			✓		✓
Utah State	✓	✓			✓	✓	✓	
Virginia Tech	✓	✓			✓	✓		✓
Frequency of Benefit Being Articulated	25 (100%)	18 (72%)	7 (28%)	20 (80%)	12 (48%)	22 (88%)	7 (28%)	23 (92%)

Source: Original

Examples of Unique Strategies

While conducting the content analysis, a number of innovative or unique benefits offered were identified. Many such benefits are tied to an institutions or community's local culture. For example, student members at LSU and the University of Arkansas are invited to an annual crawfish boil, a staple cultural event in their region. Alternatively, student members at the University of Pittsburgh (PITT) receive the official "Oakland Zoo" t-shirt to wear at basketball games. The branding of the student section in PITT's Petersen Events Center ties together its location in the Oakland neighborhood of Pittsburgh and its proximity to the Pittsburgh Zoo and PPG Aquarium which is located approximately five miles from campus. Other examples are provided below.

- **Support Students:** Opportunity to be on the football field as team enters the stadium (Virginia Tech). Complimentary Transportation to select away games (Boston College).
- **Merchandise:** 4-year members receive special merchandise in their senior years (Florida State). Seniors allow their membership to be their Senior Class Gift. Students receive commemorative mug and graduation cord (Virginia Tech). Student raffles for merchandise, autographs, game-worn apparel (Boston College).
- **Information:** Access to private study area during finals (LSU).
- **Tickets or Ticketing Process:** Complimentary or discounted tickets for PARENTS WEEKEND or HOMECOMING (Pittsburgh).
- **Facilities:** Free entry to The Rams Club Patio football pre-game tailgate (UNC Chapel Hill). Exclusive photo opportunities in stadiums (Texas A&M).
- **Events:** Those who are members for 4 years receive an exclusive graduation experience in Tiger Stadium (LSU). Opportunity to serve on Advisory Boards (Georgia Tech). Access to open practices for Basketball or Hockey (Boston College).
- **Discounts:** Naming opportunity for discount programs such as Rams Club Heels Deals (UNC Chapel Hill).
- **Member Points and Donor Profile:** Priority access to purchase future season tickets upon graduation (Baylor). Priority points for your IPTAY membership after graduation (Clemson). Earn 5 Hokie Club priority points per year you are a member (equivalent to $250 donation), (Virginia Tech).

their campus athletic fundraising organizations and offer their assistance as a school explores the possible development of a student chapter of its athletic fundraising organization.

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COVID-19 AND ITS IMPACT ON MULTINATIONAL ENTERPRISES: A VALUE AT RISK APPROACH

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ABSTRACT

Because multinational enterprises (MNEs) operate across different currencies, they have exposure to exchange rate risk. Thus, they may utilize a variety of tools to mitigate that risk. While there are different types of exchange rate risk, this study focuses specifically on the transaction exposure of cash flows denominated in the currencies of seven different emerged countries. The "modified" Value-at-Risk (MVaR) model is employed to estimate the maximum one-period losses during the eighteen months prior to the onset of the Covid-19 pandemic and, in addition, the maximum one-period losses during the eighteen months following the onset of the Covid-19 pandemic. The predicted losses using MVaR are then compared with the actual ex-post results. Our objective is to analyze the extent of the transaction exposure and provide practical insights to MNEs as they decide whether or not to hedge this risk. This study is noteworthy because it compares the pre-Covid-19 and post-Covid-19 time periods.

INTRODUCTION

Multinational enterprises are entities that engage in international business ventures in a variety of ways. While their engagement in the international arena exposes them to exchange rate risk, including transaction exposure, whether or not they should hedge this risk depends on the specific circumstances. Depending on the expected costs of and benefits of hedging, MNEs may be better off hedging their foreign currency positions. There exist a number of tools which can be used to mitigate and/or eliminate exchange rate risk. However, there may also be circumstances where maintaining an open position in a particular currency or portfolio of currencies (i.e., not hedging) is justified. Because most MNEs operate across multiple currencies, transaction exposure is generally associated with their total foreign currency portfolio. This portfolio risk is, in part, a function of the net positions in each currency (including both cash inflows and cash outflows) and the volatility of the individual exchange rates. It also depends critically on the co-movements of the currencies. As is well known, the exchange rates themselves and their co-movements are not stable over time. Accordingly, transaction exposure can change over time.

Both the "traditional" Value-at-Risk (VaR) and the "modified" Value-at-Risk (MVaR) methods may be utilized to estimate a firm's maximum one-period loss. In recent years, however, the shortcomings of the traditional VaR approach (discussed below) have become better understood. As a result, this study uses the conceptually superior MVaR approach. Given MNE's intrinsic exposure to transaction risk, and due to the volatility in the foreign exchange markets, this study aims to provide a clear comparison of the transaction risk for the eighteen-month period prior to the onset of Covid-19 and the transaction risk for the eighteen-month period following the start of Covid-19. These findings, and the associated insights, will provide an important context as MNEs consider whether or not to hedge their exchange rate risks. Because the volume of foreign exchange transactions has increased so dramatically in recent years, the stakes involved in these decisions have become very high. As indicated in Table 1, below, the daily volume of trading around the world has increased from $.14 trillion in 1985 to over $6.6 trillion in 2019. This trend is likely to continue.

We believe there are no studies (as of now) to have explored possible changes in MNE's transaction risk in the pre- and post-Covid-19 periods. It is possible that the economic instability introduced by Covid-19, including greater exchange rate volatility and changed co-variances, has had a measurable impact on transaction risk. Focusing on seven emerged countries' currencies during the eighteen months before and the eighteen months after Covid-19, we use the MVaR approach to quantify predicted losses and then compare these losses with the actual/ex-post results. This study also reveals how MNEs can minimize potential losses by determining which particular currency portfolios (i.e., combinations of currencies) have the least/most transaction risk and whether this has changed in the post-Covid-19 period. Further, the results of this study will offer valuable insights into effectively managing an MNE's short-term assets and liabilities and provide important information about potential entry and exit strategies for particular currency markets in the post-Covid-19 era.

PROBLEM STATEMENT

Nearly half a century ago, the era of fixed exchange rates system ended, and the reliability and relative predictability of fixed exchange rates gave way to today's era of floating exchange rates, with all its uncertainty and complexities. Multinational enterprises have utilized statistical techniques to quantify the exchange rate risks they face and, in addition, developed approaches to mitigate these risks. One approach to quantifying the transaction risk associated with flexible exchange rates is the traditional "value-at-risk" (VaR) approach. This approach has been popular, in part, because of its relative simplicity and straightforward interpretation. More specifically, it places a specific dollar value on the downside risk (i.e., the maximum likely loss) an MNE will experience over a specific time period at a particular confidence level. However, the principal limitation and vulnerability of "traditional" VaR is its implicit assumption the distributions of exchange rate movements are normal. Therefore, in this study, we utilize the "modified" value-at-risk (MVaR) approach, in which the skewness of the population as well as the excess kurtosis and/or absolute kurtosis are considered. In many cases, MVaR will give MNE's a more accurate estimate of their exchange rate risk.

Research questions in this study

An increasingly important question for MNEs operating across multiple emerged economies is the following: given the costs of hedging currency exposure, is it warranted for the MNE to hedge their currency exposure in the post Covid-19 era? This will be addressed by (a) comparing the "modified" value-at-risk (MVaR) measures against the actual currency gains/losses (i.e., the ex-post results) during the pre- and post-Covid-19 time periods, and (b) by analyzing the optimal currency portfolios for the seven currencies considered so that MNEs will have better information when considering their global business strategy and whether hedging their currency risks makes sense in each case.

Justification of this study

The extraordinary growth in the daily volume and value of currency trading (see Table 1, below) has given rise to significant volatility in emerged markets. In order to protect their bottom-lines, MNEs must hedge (or not hedge) their currency risks optimally. While there have been many studies utilizing "traditional" VaR measures, there have been no comprehensive studies of the "modified" value-at-risk (MVaR) measure comparing the maximum expected losses with the actual currency losses over this particular post-Covid-19 crisis period for emerged markets' currencies. A comparison of these findings with the pre-Covid-19 findings will have significant practical implications for MNEs and even mid-sized US firms that have significant revenues and/or expenditures across different emerged markets' currencies. The results of this research will help MNEs determine the best possible hedging strategy, given the expected benefits and costs of hedging and management's preference regarding the familiar risk/return trade-off.

TABLE 1: MILESTONES OF DAILY FOREIGN EXCHANGE TRANSACTION VOLUME GLOBALLY

Year	In $ trillion
1985	$ 0.14
1995	$ 1.00
2006	$ 2.00
2010	$ 4.00
2014	$ 5.00
2019	$ 6.60

It is worth noting that on December 11, 2019, the Bank of International Settlements (BIS) reported that "on an average day in 2019, the sum of all transactions in the forex market amounted to almost 6.6 trillion U.S. dollars."

The pre-Covid period in this study starts July 1, 2018 and ends December 31, 2019. It was in December of 2019 the World Health Organization (WHO) confirmed the existence of a transmissible respiratory virus emanating from Wuhan, China. The post-Covid period is from January 1, 2020 through June 30, 2021. Both the pre- and post-Covid periods are eighteen months in duration. Our study is based on daily exchange rates for seven emerged currencies using data obtained from the Federal Reserve System. Specifically, the following emerged market currencies were considered in this study: the Australian dollar (AUS), the Canadian dollar (CAD), the Euro (EUR), the British pound (GBP), the Japanese yen (JPY), the Singapore dollar (SGD), and the Swiss franc (CHF).

Figures 1 & 2, below, indicate the minimum and maximum daily percentage changes for the seven emerged market currencies during pre- and post-Covid periods. As indicated, the British pound experienced the largest percentage changes during both eighteen-month periods with +2.43% and -2.01% pre-Covid, and +3.2% and -2.68% post-Covid. [The only exception is the -3.56% reduction in the Australian dollar in the post-Covid period.] By contrast, the Singapore dollar experienced the smallest percentage changes of the seven currencies with +0.70% and -0.58% pre-Covid and +1.22% and -1.31% post-Covid.

FIGURE 1: MINIMUM & MAXIMUM DAILY PERCENTAGE CHANGE FOR EMERGED MARKET CURRENCIES (PRE-COVID JULY 2018 – DECEMBER 2019)

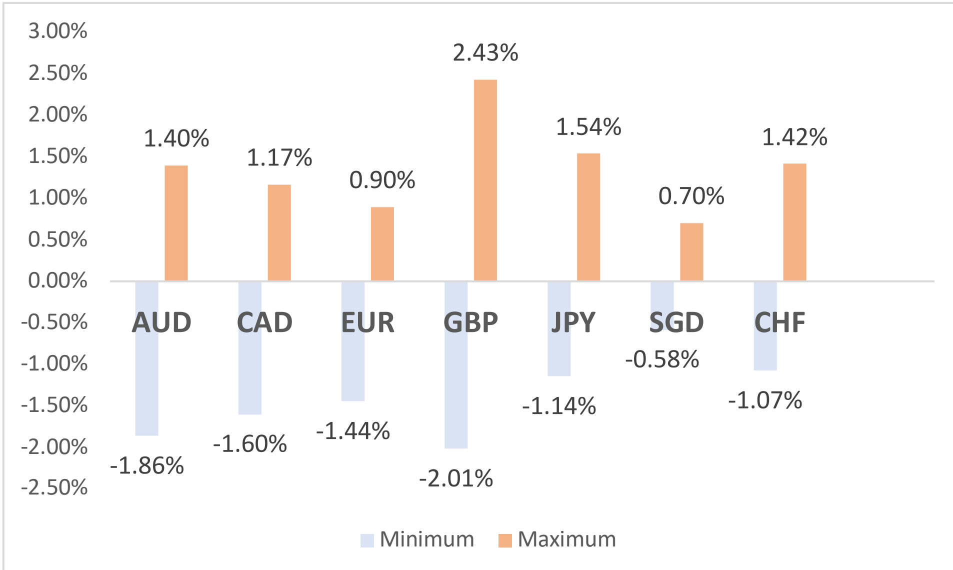
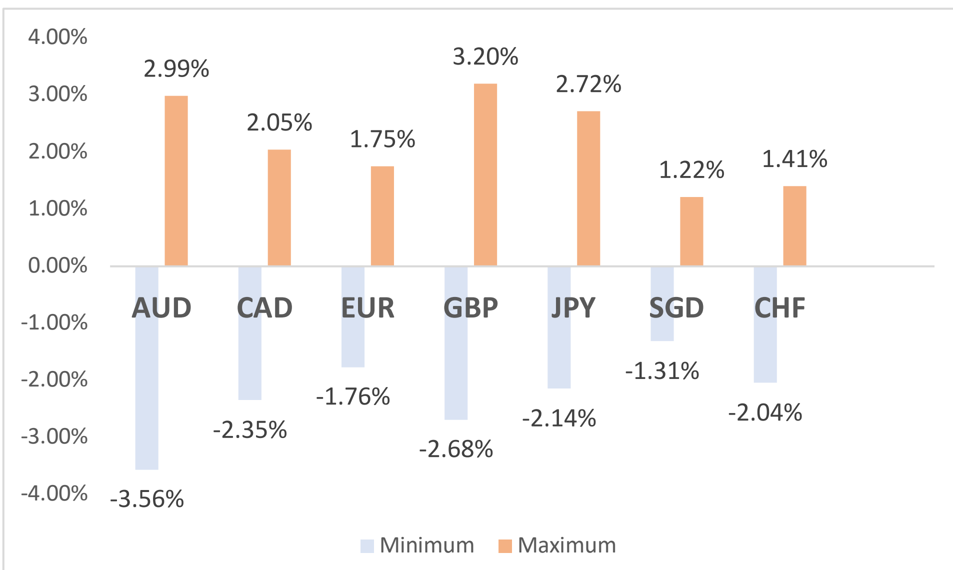


FIGURE 2: MINIMUM & MAXIMUM DAILY PERCENTAGE CHANGE FOR EMERGED MARKET CURRENCIES (POST-COVID JANUARY 2020 – JUNE 2021)



One can speculate that the relatively large upward and downward percentage changes in the British pound during the pre-Covid period (shown in Figure 1 above) are attributable to the uncertainty surrounding "Brexit" and Britain's future trade relationship with the Euro zone. The British pound's large percentage one-day increase in the post-Covid period (Figure 2, above) may reflect positive momentum in achieving a successful trade agreement with the Euro zone. One can also speculate that the comparatively large one-day percentage decrease in the value of the Australian dollar during the post-Covid period (Figure 2) was the result of trade tensions with China, including the imposition of tariffs on Australian exports.

Figures 3 and 4, below, indicate the standard deviations of the seven currencies based on their daily percent changes during the pre-Covid and post-Covid periods. As indicated in Figure 3, the British pound and the

Singapore dollar experienced the highest and the lowest volatility in the pre-Covid period, respectively, with standard deviations of .5174% and .2077%. During the post-Covid months (Figure 4), the Australian dollar and the Singapore dollar had the highest and the lowest variability with standard deviations of .7500% and .2974%, respectively.

FIGURE 3: STANDARD DEVIATION OF EMERGED MARKET CURRENCIES (PRE-COVID JULY 2018 – DECEMBER 2019)

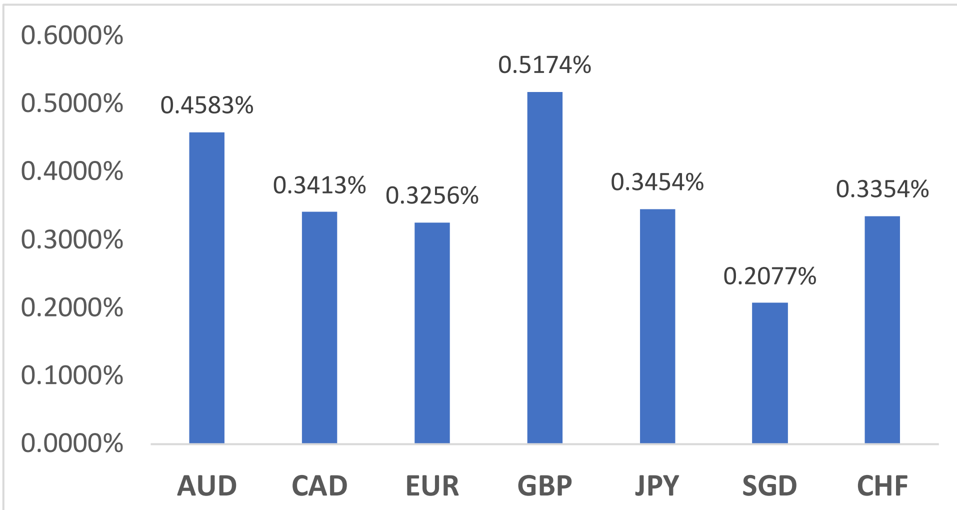
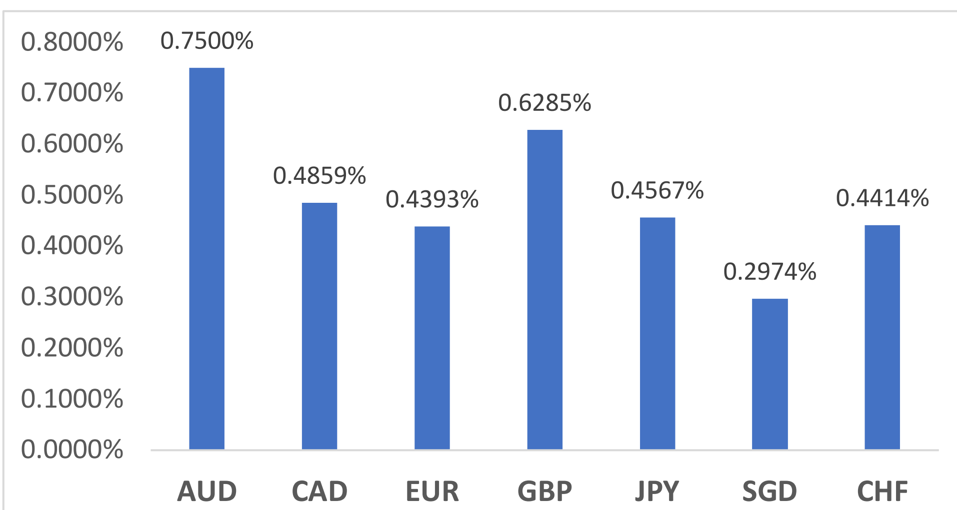


FIGURE 4: STANDARD DEVIATION OF EMERGED MARKET CURRENCIES (POST-COVID JANUARY 2020 – JUNE 2021)



The large volatility of the British pound during pre-Covid period (Figure 3, above) may reflect, as previously described, uncertainty over Brexit and repeated failed negotiations with the Euro zone on free trade and tariffs. In addition, the forced resignation of former Prime Minister Theresa May in July 2019 may have destabilized the pound.

Figure 4, above, indicates the Australian dollar had the highest standard deviation among the seven currencies during the post-Covid period. A likely explanation for this instability is, once again, Australia's trade dispute with China. China restricted imports of beef, barley, wine, coal, cotton from Australia between May through December 2020, likely destabilizing the Aussie dollar.

BACKGROUND / LITERATURE REVIEW

- Cayton, Mapa and Lising (2010) show that VaR has become an increasingly popular way for financial institutions to measure the risk of holding assets in multiple currencies.
- Mohammadi and Akhtekhane (2012) estimate the risk associated with the U.S. dollar/rial exchange rate using VaR. Mabrouk and Aloui (2011) and Rejeb, Salha and Rejeb (2012), Khazeh and Winder (2010) also employ the VaR methodology to estimate the exchange rate risk associated with multiple currencies and currency portfolios.
- The study by Artzner, Delbaen, Eber and Health (2001) was the first to explore the concept of conditional VaR. Additional articles include Kaut, Wallace and Zenios (2007), Basak and Shapiro (2001) and Alexander and Baptista (2004).

Using the standard divisions of the seven emerged currencies studied (shown in Figures 3 and 4, above) and, equally important, their correlation coefficients (subsequently described), our study will be the first to compare the MVaR of various combinations (portfolios) of emerged currencies with their ex post results (i.e., the actual maximum losses) for both the pre-Covid and post-Covid time periods. An evaluation of these findings should provide MNEs key insights and objective data on the potential costs and benefits of hedging their exchange rate risks, and how these benefits and costs may have changed in the post-Covid era.

METHODOLOGY

The exchange rate data was obtained from the Federal Reserve website. In this study, the results for the maximum 1-period holding period loss for an individual currency "i" or for a portfolio of currencies "p" is

$$E(e_t) - (Z) \text{ x } (\sigma_{i \text{ or } p}) \tag{1}$$

where $E(e_t)$ is the expected percentage change in the currency's value for the relevant period.

The results for the "modified" maximum 1-period holding loss for an individual currency "i" or for a portfolio of currencies "p" can be estimated using

$$E(e_t) - (ModZ)x\,(\sigma_{i \text{ or } p}) \tag{2}$$

where

$$ModZ = (z + \frac{Skew(z^2-1)}{3!} + \frac{Kurt(z^3-3z)}{4!} + \frac{Skew^2(2z^3-5z)}{36}) \tag{2A}$$

where

z is the normal z-score corresponding to the desired confidence level
Skew is the skewness of the population
Kurt is the excess kurtosis or absolute kurtosis - 3

Portfolio's variance is computed using the equation below:

$$\sigma_p^2 = \sum_i w_i^2 \sigma_i^2 + \sum_i \sum_{j \neq i} w_i w_j \sigma_i \sigma_j \rho_{ij}, \tag{3}$$

where
σ_p = standard deviation of daily % changes in currency portfolio
σ^2_p = variance of daily % changes in currency portfolio
w_i = proportion of total portfolio value denominated in currency i
w_j = proportion of total portfolio value denominated in currency j
σ_i = standard deviation of weekly percentage changes in currency i
σ_j = standard deviation of weekly percentage changes in currency j
ρ_{ij} = correlation coefficient of weekly percentage changes between currencies i and j

Currency Correlation

The correlation coefficients (included in the above equation) between any given pair of currencies can vary and, hence, are not stable and/or constant over time. Based on their daily percentage changes, the correlation coefficients for the seven emerged market currencies for the pre-Covid and post-Covid periods are presented in Tables 2 & 3, below. As can be observed, for any given pair of currencies the correlation coefficients generally change from one time period to the next. As examples, the correlation coefficient for the JPY/CAD exchange rate changed from -.0393 (pre-Covid) to .1338 (post-Covid); for the JPY/AUD exchange rate the correlation coefficient changed from .0223 (pre-Covid) to .3102 (post-Covid).

TABLE 2: CORRELATION COEFFICIENTS BETWEEN EMERGED MARKET CURRENCY PAIRS (PRE-COVID: JULY 2018 – DECEMBER 2019)

	AUD	CAD	EUR	GBP	JPY	SGD	CHF
AUD	1.0000	0.5413	0.4860	0.3094	0.0223	0.7499	0.2389
CAD		1.0000	0.3608	0.2862	-0.0393	0.5263	0.2231
EUR			1.0000	0.4807	0.2673	0.6316	0.6741
GBP				1.0000	0.0918	0.4429	0.2533
JPY					1.0000	0.1157	0.5067
SGD						1.0000	0.3548
CHF							1.0000

TABLE 3: CORRELATION COEFFICIENTS BETWEEN EMERGED MARKET CURRENCY PAIRS (POST-COVID: JANUARY 2020 – JUNE 2021)

	AUD	CAD	EUR	GBP	JPY	SGD	CHF
AUD	1.0000	0.7640	0.6151	0.7181	0.3102	0.8159	0.4822
CAD		1.0000	0.5047	0.6284	0.1338	0.6848	0.3706
EUR			1.0000	0.5812	0.4828	0.6911	0.8577
GBP				1.0000	0.3710	0.7260	0.5092
JPY					1.0000	0.3590	0.5681
SGD						1.0000	0.5765
CHF							1.0000

Modified Value-at-Risk, Ex-Post Results and Standard Deviations

Tables 4 and 5, below, compare the predicted MVaR against the actual ex-post results for each individual currency for the pre-Covid and post-Covid periods, respectively. The MVaR predicts what will be the maximum one-day loss for the particular currency. What is shown in Tables 4 and 5 is the average daily MVaR for the entire 18-month time period. The ex-post result is the actual average daily gain/loss for the particular currency for the entire 18-month time period. It is worth noting that the MVaR for the pre-Covid period indicates the British pound (GBP) had the largest likely average maximum one-day loss (-1.57392%). For the post-Covid period, the Australian dollar (AUD) had the largest likely maximum likely one-day loss (-2.036%). Despite these predicted maximum losses, the actual ex-post results for the GBP and the AUD for both periods were *gains* of 25.10625% & 0.046% respectively. There were, in fact, no losses in either case.

TABLE 4: EMERGED MARKETS CURRENCIES REALIZED RETURN AND MVAR (PRE-COVID JULY 2018 – DECEMBER 2019)

Currency	$(S_1 - S_0)/S_0$	MVaR @ 99%
SGD	0.7569 %	-0.5175%
EUR	-0.1869%	-0.7884%
CHF	0.0890%	-0.9568%
CAD	1.5406%	-0.8963%
JPY	0.0959%	-1.0410%
AUD	-0.2770%	-1.1158%
GBP	25.1062%	-1.5739%
Average	3.8750%	-0.9842%

TABLE 5: EMERGED MARKETS CURRENCIES REALIZED RETURN AND MVAR (POST-COVID JANUARY 2020 – JUNE 2021)

Currency	$(S_1 - S_0)/S_0$	MVaR @ 99%
SGD	0.593%	-0.804%
EUR	0.081%	-1.133%
CHF	0.062%	-1.148%
CAD	0.003%	-1.318%
JPY	-0.021%	-1.908%
AUD	0.046%	-2.036%
GBP	0.192%	-1.918%
Average	.1367%%	-1.4664 %

Importantly, comparing MVaR with the ex-post results during the pre-Covid period (Table 4) reveals that, with the exception of EUR and AUD which experienced moderate losses, unhedged positions on all other currencies would have resulted in gains. Comparing the averages across all seven currencies, the actual ex-post gain of 3.8750% was far superior to the average MVaR of -0.9842%. With respect to the post-Covid period (Table 5), the findings were quite similar: with the exception of JPY, which experienced a modest actual loss, unhedged positions in all other currencies would have resulted in gains. Comparing the averages across all seven currencies, the ex-post gain of .1367% was far superior to the average MVaR of -1.4664%.

RESULTS

Equally weighted Modified Value-at-Risk (MVaR) estimates and the realized/ex-post outcomes ($(S_1-S_0)/S_0$) for the currency portfolios of the seven emerged markets are presented in Tables 6 and 7, below. Table 6 represents the pre-Covid period. Table 7 represents the post-Covid period. For both periods, MVaR is based simply on the arithmetic averages of the MVaR for each currency included, but not including the impact of any possible interactions (correlations) between the currencies. These equally weighted portfolios are constructed starting with the currency with the lowest standard deviation. Then each additional currency is added from lowest to highest volatility. Accordingly, the last currency added to the portfolio has the highest standard deviation. Since these are equally weighted portfolios, every additional currency added to the portfolio increases the average predicted maximum one-day loss, as evident from the rising Avg MVaR values in both Tables 6 & 7.

TABLE 6: EMERGED MARKETS EQUALLY WEIGHTED CURRENCY PORTFOLIO (PRE-COVID JULY 2018 – DECEMBER 2019)

Currency	Avg $(S_1 - S_0)/S_0$	Avg MVaR	Portfolio Composition
SGD	0.7569%	-0.5175%	SGD
EUR	0.2850%	-0.6530%	SGD, EUR
CHF	0.2197%	-0.7542%	SGD, EUR, CHF
CAD	0.5499%	-0.7898%	SGD, EUR, CHF, CAD
JPY	0.4591%	-0.8400%	SGD, EUR, CHF, CAD, JPY
AUD	0.3364%	-0.8860%	SGD, EUR, CHF, CAD, JPY, AUD
GBP	3.8750%	-0.9842%	SGD, EUR, CHF, CAD, JPY, AUD, GBP

TABLE 7: EMERGED MARKETS EQUALLY WEIGHTED CURRENCY PORTFOLIO (POST-COVID JANUARY 2020 – JUNE 2021)

Currency	Avg $(S_1 - S_0)/S_0$	Avg MVaR	Portfolio Composition
SGD	0.5930%	-0.8044%	SGD
EUR	0.3369%	-0.9685%	SGD, EUR
CHF	0.2454%	-1.0282%	SGD, EUR, CHF
CAD	0.1848%	-1.1007%	SGD, EUR, CHF, CAD
JPY	0.1437%	-1.2622%	SGD, EUR, CHF, CAD, JPY
AUD	0.1274%	-1.3912%	SGD, EUR, CHF, CAD, JPY, AUD
GBP	0.1367%	-1.4664%	SGD, EUR, CHF, CAD, JPY, AUD, GBP

In contrast to Tables 6 and 7 which were based solely on arithmetic averages, Tables 8 and 9 (below) show both the MVaR and the standard deviations of the currency portfolios including the effect of the covariances between the various currencies. As we construct the currency portfolio using rolling standard deviation, correlation coefficient on an annual basis, the computed MVaR value for portfolios are different from table 6. For example, in table 4 and 6 the SGD MVaR value is -0.5175% (which is computed using eighteen months of return), whereas the in table 8 SGD MVaR value is it is -0.5071% (rolling returns for annually with six months of return). They reflect, in a sense, *optimal* currencies portfolios based on modern portfolio theory and, hence, should provide superior information to MNEs about the risks of operating across multiple currencies. A point of clarification: We use nonlinear optimization methods to construct the optimal portfolios. The order of each currency's entry in the portfolio numerically makes the MVaR as small as possible at every instance. The MVaR of the portfolio is a complex function of the standard deviation as well as the kurtosis, etc., from the MVaR equation (page 6). So, the entry order is influenced by the standard deviation, but also the covariances and kurtosis (i.e., we might have two currencies with equal standard deviations but unequal kurtosis, leading one of the two to be favored).

TABLE 8: EMERGED MARKETS EQUALLY WEIGHTED CURRENCY PORTFOLIO (PRE-COVID JULY 2018 – DECEMBER 2019)

Portfolio SD	MVaR	Portfolio Composition
0.20487%	-0.50714%	SGD
0.23691%	-0.59135%	SGD, EUR
0.24346%	-0.63138%	SGD, EUR, CHF
0.23027%	-0.56748%	SGD, EUR, CHF, CAD
0.21458%	-0.55753%	SGD, EUR, CHF, CAD, JPY
0.22666%	-0.54058%	SGD, EUR, CHF, CAD, JPY, AUD
0.23261%	-0.54482%	SGD, EUR, CHF, CAD, JPY, AUD, GBP

TABLE 9: EMERGED MARKETS EQUALLY WEIGHTED CURRENCY PORTFOLIO (POST-COVID JANUARY 2020 – JUNE 2021)

Portfolio SD	MVaR	Portfolio Composition
0.27649%	-0.86516%	SGD
0.32258%	-0.35053%	SGD, EUR
0.33795%	-1.08286%	SGD, EUR, CHF
0.32991%	-1.07858%	SGD, EUR, CHF, CAD
0.31115%	-0.88095%	SGD, EUR, CHF, CAD, JPY
0.35315%	-0.97098%	SGD, EUR, CHF, CAD, JPY, AUD
0.36611%	-0.98308%	SGD, EUR, CHF, CAD, JPY, AUD, GBP

In the pre-Covid period (Table 8, above), other than the Singapore dollar, we find that the equally weighted five currency portfolio of the Singapore dollar, Euro, Swiss Franc, Canadian dollar, and Japanese Yen has the lowest standard deviation (.21458%), while the six-currency portfolio of the Singapore dollar, Euro, Swiss Franc, Canadian dollar, Japanese Yen and Australian dollar has the lowest MVaR value (-.54058%). For the post-Covid period (Table 9, above), other than the Singapore dollar, we find that the equally weighted five currency portfolio of the Singapore dollar, Euro, Swiss Franc, Canadian dollar, and Japanese Yen also has the lowest standard deviation (0.31115%). Interestingly in the post-Covid period, the two-currency portfolio of the Singapore dollar and the Euro has the lowest MVaR value (-0.35053%).

CONCLUSION AND FUTURE DIRECTION

Utilizing the MVaR approach, the maximum likely 1-period portfolio losses ranged from -0.9842% in the pre-Covid period to -1.4664% in the post-Covid period (Tables 6 and 7). Surprisingly, the realized/ex-post results for those same portfolios for the two time periods were +3.8750% and +0.1367%, respectively.

These results strongly suggest that MNEs operating in the seven identified emerged currency markets who hedge their positions on routine basis should pause to reevaluate their hedging strategy. Hedging is expensive, and maintaining a hedge is costly. Our findings indicate that MNEs with net overall cash inflows would have benefited by *not hedging* their currency positions during both time periods, regardless of how many of the seven emerged market currencies they were dealing with. Of course, any MNEs experiencing net cash outflows would indeed have benefited from hedging their positions.

In addition to the above findings, a comparison of the volatility in the emerged countries' currency markets in the pre- and post-Covid periods is revealing as transaction risk seems to have increased in the post-Covid era. Specifically, the maximum one-period loss surged by nearly 49% post-Covid, while, at the same time, the realized gain plummeted by nearly 96%. For the future, an analysis of an expanded time frame may provide MNEs with an even clearer and more confident understanding of the decision-making process.

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CUSTOMIZING LEARNING ENVIRONMENTS FOR STUDENTS IN HIGHER EDUCATION: IS IT A BRIDGE TOO FAR?

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Abstract:

The recent Covid-19 pandemic forced most higher learning institutions in the United States to transition from their traditional classroom to online learning format to deliver course content to their students. This enforced adoption has changed the student's and instructor's perspective on education. Moreover, some institutions plan to utilize online learning and a hybrid-flexible learning format even after the pandemic [2]. This study draws on the tenets of the Person-Environment fit theory to determine practices for improving student learning satisfaction in online courses. In particular, the focus is to understand how the fit between student needs measured in terms of emotional intelligence and technology readiness and the instructional environment measured in terms of instructor support and instructor performance affect students' learning satisfaction in an online course. The data for this study will be collected from undergraduate students enrolled in at least one three-credit online course during the academic period, 2020-21. The focus of data analysis will be on testing the level of fit.

Keywords: Instructor support, technology readiness, learning environment, emotional intelligence, student performance, learning satisfaction

Introduction

The recent Covid-19 pandemic has coerced higher education institutions in all genres to re-evaluate their course offerings in terms of program variety and consider using different types of technologies to support a myriad of instructional design models and methods. Education professionals suggest that successful institutions will manage these challenges by creating opportunities for educators to develop new, impactful, and relevant modes of teaching by taking advantage of technology. In addition, deliver an engaging and holistic learning experience for students that strengthen their overall academic success [9]. At present, nearly 300 plus institutions are planning to continue with either a purely online learning model or a hybrid-flexible learning model [1]. However, anecdotal evidence suggests that the effectiveness of the online/hybrid model depends mainly on the factors related to both the instructor and the student [~~30,~~ 29].

Extant literature on academic success reveals that attributes of online learning such as instructor's support, technology readiness, and emotional intelligence enhance effectiveness in "learner-centered" setting [20,35]. Accordingly, research has focused on understanding learner attributes and perceptions, and interaction patterns between the instructor and the learner. However, prior research on teaching and learning has seldom applied a prominent theory base [35]. This study draws on the tenets of the Person-Environment (P-E) fit theory framework. The goal is to investigate how the fit between student needs (emotional intelligence and technology readiness) and the instructional environment (instructor support and instructor performance) affect student learning satisfaction in an online course.

The paper begins by reviewing the theoretical foundations of the P-E fit theory, followed by a comprehensive review of emotional intelligence, technology readiness, and the role of instructor literature. Next, the research model and the hypotheses are presented. Finally, since this research is in progress, a brief discussion on data collection and methodology is described, followed by potential implications.

Person-Environment (P-E) Fit Theory

P-E fit theory is a widely recognized psychological theory in extant organizational behavior literature to illustrate the process of adjustment between individuals and their social setting. In particular, it explores the congruence in person-job fit, person-organization fit, person-group fit, and person-supervisor fit [20]. This suggests that the P-E fit framework can be applied at multiple levels. Organizational research [6,17,18] indicates that stress arises from distinguishing between the persons' needs and abilities and the environmental supplies and demand they operate, thus increasing strain and decreasing performance. On the other hand, others posit that the fit between personal and situational factors leads to positive outcomes, such as satisfaction, commitment, and well-being, enhancing performance [14].

The P-E fit framework applies to educational context because it provides multitude ways to increase academic success, such as student learning satisfaction, grades, and perceived performance [17,18]. However, P-E fit in educational contexts focuses on the fit between a student's interest and the subject [31]. On the other hand, the major topics in higher education research are student ability and institutional demand. Thus, this study applies the P-E fit theory based on the needs-supplies fit.

In the needs-supplies fit model, the individual's need encompasses natural biological and psychological conditions, values acquired through learning and socialization, and motives to achieve desired ends. On the flip side, the supplies in the environment refer to extrinsic and intrinsic resources and rewards that may fulfill the individuals' needs, such as an opportunity to achieve the desired outcome [13].

The most superior outcomes in the context of higher education are academic satisfaction [22]. Accordingly, this study applies the P-E fit framework to posit that the fit between students' needs and the reinforcement provided through instructor support and performance results in higher learning satisfaction.

Emotional Intelligence

Salovey and Mayer [30] identify five domains of emotional intelligence (EI): self-awareness, managing emotions, self-motivation, empathy, and relationship management. Goleman [16] indicates that EI is multidimensional. It comprises of self-awareness, mood regulation, internal motivation, empathetic response, and interpersonal skills. Bar-On [3] view EI as non-cognitive intelligence. It defines EI as an array of emotional, personal and social abilities and skills that influence an individual's ability to cope effectively with environmental demands and pressures.

While there are different notions of emotional intelligence and parallel EI models, a standard agreement among researchers is that EI refers to the ability to accurately perceive, evaluate, regulate and express one's own emotions [32] This study applies the Salovey and Mayer [30] definition of EI - it consists of various adaptive abilities: appraisal and expression of emotion, regulation of emotion, and utilization of emotions in solving problems. Four dimensions are used as representatives:

- Self-Awareness refers to knowing one's internal states, preferences, resources, and intuitions. It also involves emotional Awareness, which is deemed the fundamental core ability of EI, and the ability to know one's strengths and limits and self-confidence.
- Self-Management refers to managing one's internal states, impulses, and resources. The Self-Management cluster consists of six competencies, including self-control, being trustworthy, conscientious, adaptable, taking the initiative, and having the drive to achieve.
- Social Awareness refers to how people handle relationships and Awareness of others' feelings, needs, and concerns. It involves empathy, a service orientation toward customers or clients, political Awareness and understanding of others, and the ability to cultivate opportunities through different people.
- Relationship Skills concern the skill or adeptness at inducing desirable responses in others, including general communication ability, ability to influence others, manage conflict, inspire others via a vision, recognize and catalyze change, collaborate with others, and promote teamwork.

There is a growing consensus among educators and researchers that EI is an essential skill for students to develop, both for their future well-being and academic success [11]. A recent meta-analysis conducted by MacCann [23] reveals a significant positive correlation between students' EI and their learning satisfaction. This study uses EI construct to measure the 'needs' dimension in the P-E fit framework.

Technology Readiness

The term technology readiness (TR) was initially proposed as a factor that fosters or hinders the adoption of new technologies. According to Parasuraman [27], TR is a personality trait-like variable that captures users' general attitudes toward accepting new technologies. This attitude is a state of mind that determines a person's predisposition to use new technologies based on one's mental enablers and inhibitors.

Most researchers [4,33,41] measure TR as a multifaceted construct to describe the user's behavior process behind the adoption of technological products and services. The enablers of TR are represented in terms of Optimism and Innovativeness. On the contrary, the inhibitors of TR are characterized in terms of Discomfort and Insecurity. This study utilizes these four TR dimensions to determine an student’s TR into the P-E fit framework's 'need' dimension.

- Optimism: a positive view of technology and a belief that it offers people increased control, flexibility, and efficiency in their lives.
- Innovativeness: a tendency to be a technology pioneer and thought leader.
- Discomfort: a perceived lack of control over technology and a feeling of being overwhelmed by it.
- Insecurity: distrust of technology, stemming from skepticism about its ability to work appropriately and concerns about its potentially harmful consequences.

Instructor Support

Several studies attest to the importance of the role of an instructor in facilitating the student learning process. Instructors directly or indirectly impact students' learning experience and outcomes by providing an engaging and high-quality learning environment [21,41]. Ryan and Deci [28], described instructors' support based on three dimensions: autonomy, structure, and involvement. Autonomy includes the provision of choice, relevance, and respect to students. The design provides clarity of expectations and contingencies. Involvement focuses on warmth, affection, dedication of resources, and understanding the student. Hung and Chou [19] discussed instructor support across five dimensions: course design and organization, facilitation during the discussion, social supporter, technology facilitator, and assessment design. Finally, Eom et al. [15] viewed instructor support as a mix of indicators representing their knowledge and roles as facilitator and intellectual stimulator.

One might argue that the classical concept of instructors being "the sage of the stage," transmitting knowledge to their students is now being replaced by the student-centered learning paradigm. Especially in an online learning environment, instructors are considered "facilitators," i.e., to guide students through the learning process. The role of the instructor is to enhance students' understanding of the course content, acknowledge their engagement, and motivate them to explore new knowledge through various facilitation strategies such as discussion forums, instructional videos, and simulated activities [40].

This study operationalizes instructor support based on the social support model. In particular, instructor support is captured through mechanisms utilized to encourage student participation, to provide timely and relevant feedback, to provide information for tracking progress, treating students with respect, and motivating students to perform better.

Instructor Performance

Technology has induced a new model of content delivery. Online instruction has emerged as an alternative mode of teaching and an essential supplement to traditional face-to-face education. Evaluation of the effectiveness of an online instruction modality requires two distinct components - the content (curriculum) provided within the online course and the instructor's facilitation of the learning experience [1]. The content curriculum expert may develop the course content; however, the instructor always delivers the course content in an online course.

According to Collis [8], the instructional implementation of the technology determines the learning effects. Webster and Hackley [37] suggest instructor performance can be monitored using the following three characteristics: instructors' attitude towards technology, instructor's teaching style, and instructors' control over technology. Accordingly, this study measures instructor performance based on their ability to use online technology effectively. More specifically, how do they use digital tools to stimulate learning, demonstrate subject matter expertise, and provide clear instructions to so that students have an overall satisfactory online learning experience.

Learning Satisfaction

A review of the extant literature in online education indicates using both cognitive and affective perspectives for measuring learning outcomes. For example, researchers estimate learning outcomes through course effectiveness, student performance, or student achievement in terms of course grades in the cognitive perspective [4,12] while the affective perspective uses students' attitudes, such as student satisfaction.

Students' learning satisfaction is a state described by a person who has experienced performance or an outcome that fulfilled their expectations [24,28]. In other words, it is a combination of one's relative level of experience and perceived performance resulting from the educational service during the study period. Chang and Chang [7] suggest that individuals have different learning needs, focusing on various learning activities and obtaining varying levels of learning satisfaction. Accordingly, this study measures learning satisfaction using four indicators of learning: increased interest in the subject matter, fulfill course learning objectives, relevant subject matter information, and overall satisfactory learning experience,

Research Model

The primary goal of this study is to assess how the fit between student needs measured in terms of emotional intelligence and technology readiness and the instructional environment measured in terms of instructor support and instructor performance affect students' learning satisfaction in an online course.
Accordingly, the research model is depicted in figure 1.

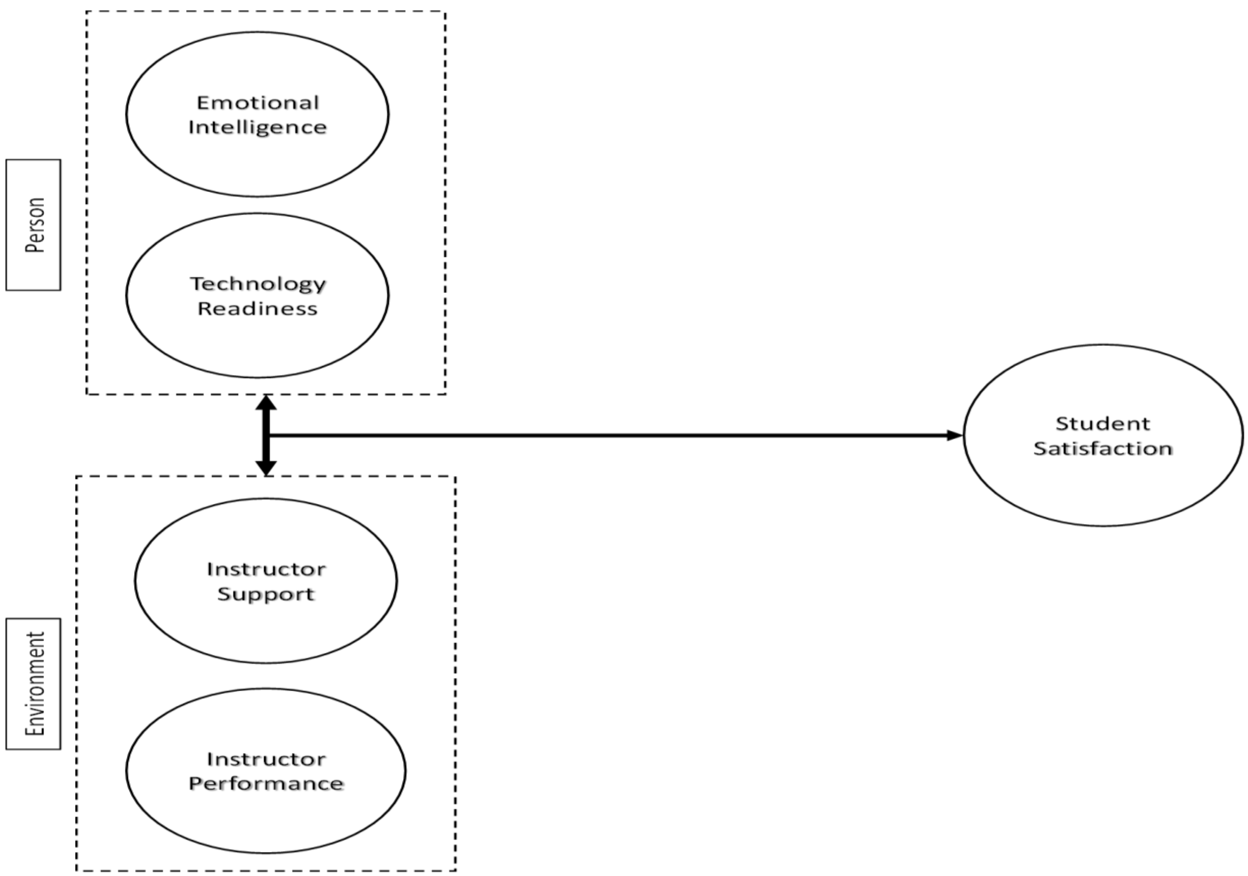

Figure 1. Research Model to Test Fit

Research Hypothesis

Chang and Chang [7] suggest that individuals have different learning needs, focusing on other learning activities and obtaining varying levels of learning satisfaction. In online learning environments, instructors help fulfill the students' diverse learning needs through various scaffolding and facilitation strategies using cloud computing tools [24]. Studies also show that instructional support and performance toward and control of the technology are critical predictors of students' learning satisfaction in an online learning setting [20,26]. In this study, based on the needs-supplies dimension of the P-E fit theory we hypothesize -

H1: Fit between the student needs and the instructional environment will positively affect student learning satisfaction.

H2: Misfit between the student needs and the instructional environment will have an adverse effect on student learning satisfaction.

Methodology

This study will use a survey-based instrument to collect data. The measures for each of the constructs shown below are adopted from the existing extant literature.

Construct (Dimensions)	# of Items	Measurement items adopted from…
Technology Readiness Index	12	[10,26]
Emotional Intelligence	17	[25,34]
Learning Satisfaction	6	[37]
Instructor Support	5	[19,36,39]
Instructor Performance	5	[1,38]

The target sample for this study is students enrolled in at least one three-credit undergraduate online course from a degree-granting institution in the United States during the academic year 2020-21. The final survey instrument consists of forty-five content questions, nine demographic questions, and two enforced quality check questions to make sure respondents read the questions thoroughly and not just speed through the survey. A five-point Likert scale method was adopted for the measurement of the questionnaire items.

Potential Implication

The primary contribution of this study is to guide degree-granting universities in the United States identify and develop best practices for improving student learning satisfaction in online courses. More specifically, explicate how to improve student performance by focusing on how to meet the students' needs and discuss how instructors meet the needs of the students in the online environment to increase student learning satisfaction.

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DAY OF THE WEEK EFFECT IN US EQUITY MARKET: 2001-2020

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ABSTRACT

Numerous studies have been performed to investigate day of the week anomalies in the equity markets all around the world. Many of these studies have utilized arithmetic means to compute average daily returns. Additionally, they don't reflect the contemporary patterns that exist in modern equity markets structure. This study aims to portray differences in US equity market daily returns during 2001-2020, based on both arithmetic and geometric means. The study further computes seasonal indexes for the days of the week when trading takes place. The results of this research mainly reveal that Mondays are least pleasing to the general equity investors, as the average daily return on stocks as represented by S&P 500 was actually negative. Additionally, the standard deviation of daily returns was the highest on Mondays. Tuesdays, on the other hands, were the most favorable day of the week on the grounds of the highest daily return.

Key Words: Market Returns, Geometric Mean, Day of The Week, Ratio to Moving Average, Seasonal Indexes.

JEL: G11, G12, G17

INTRODUCTION

There have been enough changes in the equity market arena in the past 20 years that would necessitate contemporary studies for the day-of the week phenomenon in the equity market. Average Daily Trading Volume (ADTV) of stocks comprising S&P 500 has gone up from 1.23 billion shares in 2001 to 4.92 billion shares in 2020. There are many factors that have caused this more than four-fold increase in trading activity. Proliferation of computerized trading, rapid growth of exchange traded funds (ETF's), introduction of leveraged ETF's, higher percent of younger individuals and even teenagers investing in equity markets, have all played a significant role in elevation in trading activity. These factors might have very well changed the day-of-the-week trading pattern. In addition, in efficient markets, one would expect that once an exploitable pattern, such as a daily return anomaly is known, investors would alter their trading patterns to exploit the anomaly, and therefore such anomalies should not persist over long periods of time. It is the intention of this study to update the information on the day-of-the-week effect in view of changes in trading pattern and compute daily indexes using ratio-to-moving-averages method, to explore the persistence of this anomaly over decades.

REVIEW OF LITERATURE

In an attempt to devise loftier investment strategies, equity market research analysts have always tried to detect patterns in the stock market performance. Research on possible day-of-the-week variations in S&P 500 stocks dates back to 1950's, Cengiz, et al. (2017). Most research shows that Monday returns are radically different from other days of the week and are often negative. Gibbons and Hess (1981) found that "Contrary to this plausible assumption, the expected returns on common stocks and treasury bills are not constant across days of the week. The most notable evidence is for Monday's returns where the mean is unusually low or even negative….". Sias and Starks (1995) found that day-of-the-week effect for portfolio of individuals is less pronounced than portfolios and institutional stock portfolios. Wang, et al. (1997) found that the Monday effect usually occurs during that last two weeks of the month (fourth and fifth weeks) and the average Monday return during the first three weeks of the month is not significantly different from zero. Berument and Kiymaz (2001) found that the lowest and highest daily returns coincided with Mondays and Wednesdays respectively, whereas the lowest and highest volatility occurred on Wednesdays and Fridays.

DATA AND METHODOLOGY

In this study, we used daily values of S&P 500 total return from Yahoo Finance website (http://www.finance.yahoo.com) from January 1, 2001 to December 31, 2020. During this period, there were 5032 trading days. In order to perform a robust and meaningful analysis, we deleted data for weeks where the financial markets were closed for at least one of the trading days of the week. During the period of the study, 860 weeks were identified where trading took place in all five days of the week. We conducted various statistical and financial analyses to compute average daily return for Monday, Tuesday, Wednesday, Thursday, and Friday.

Ratio-to-Moving-Average method was used to detect daily variation. Since each week consists of five trading days, five period moving averages were used to compute daily indexes for average daily return in SP500TR.

Additionally, Ordinary Least Squares method (OLS) utilizing five dummy variables was employed to predict the daily returns as well as to test for significant difference among average daily returns for different days of the week.

ANALYSIS OF RESULTS

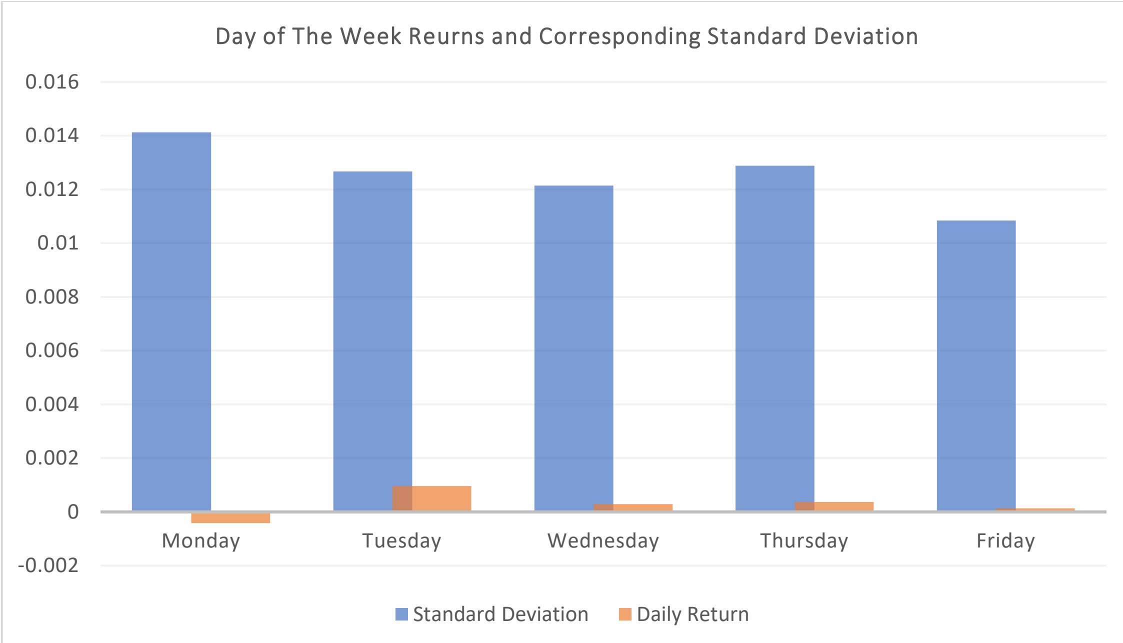
During the period of study, there were 1042 weeks. We only considered the 860 weeks with complete five trading days. Exhibit 1 provides the descriptive statistics for the period of the study. It shows that the average daily return for Mondays (-0.0004169 or -0.0417%) is lowest and for Tuesdays (0.000962844 or 0.0963%) is the highest. Interestingly, Mondays also have the highest level of volatility, as measured by standard deviation (0.0141) and Fridays have the lowest degree of volatility (0.0108). The highest and lowest one-day return over the study period also took place on Mondays (11.58% and -11.98%).

Exhibit 1: Descriptive Statistics for S&P 500 TR daily returns (January 2001-December 2000)

Day of The Week	Monday	Tuesday	Wednesday	Thursday	Friday
Mean	-0.0004169	0.000962844	0.00029424	0.000373	0.000128
Standard Deviation	0.0141235	0.012671357	0.01214185	0.012883	0.010843
Kurtosis	17.0672776	11.96409748	7.60923254	8.696446	8.6226
Skewness	-0.8464027	1.524630658	-1.0569701	-0.94178	0.610141
Range	0.23561004	0.165273975	0.14759646	0.164262	0.1364
Minimum	-0.1197987	-0.057386182	-0.0902591	-0.09491	-0.04319
Maximum	0.11581138	0.107887793	0.05733737	0.069348	0.093207
Count	860	860	860	860	860

Exhibit 2 portrays daily returns and corresponding standard deviations. As we will demonstrate, there were no significant differences among the average daily returns.

Exhibit 2: Average Daily Returns and corresponding Standard deviations for the five trading days of the week



A single factor Analysis of Variance was conducted to determine if there are significant differences among average daily returns. Exhibit 3 is a portion of the output for ANOVA depicting no significant differences among daily returns (p-value = 0.253798).

Exhibit 3: Single factor ANOVA testing for significant differences among average daily returns

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.000846	4	0.000211	1.336487	0.253798	2.374001
Within Groups	0.679463	4295	0.000158			
Total	0.680309	4299				

Assume that an individual could invest in S&P 500 total return and gain the average daily return of a given trading day of the week for the entire year. For example, fan investor for all trading days in a given year (typically 253 days), make the Tuesdays daily return of 0.0963 percent. The annualized return for this investor would be 25.57 percent. Notice that the annualized return for S&P 500TR during the period of study was 7.46%. Exhibit 4 shows the annual return with the assumption made for the 5 different trading days.

Exhibit 4

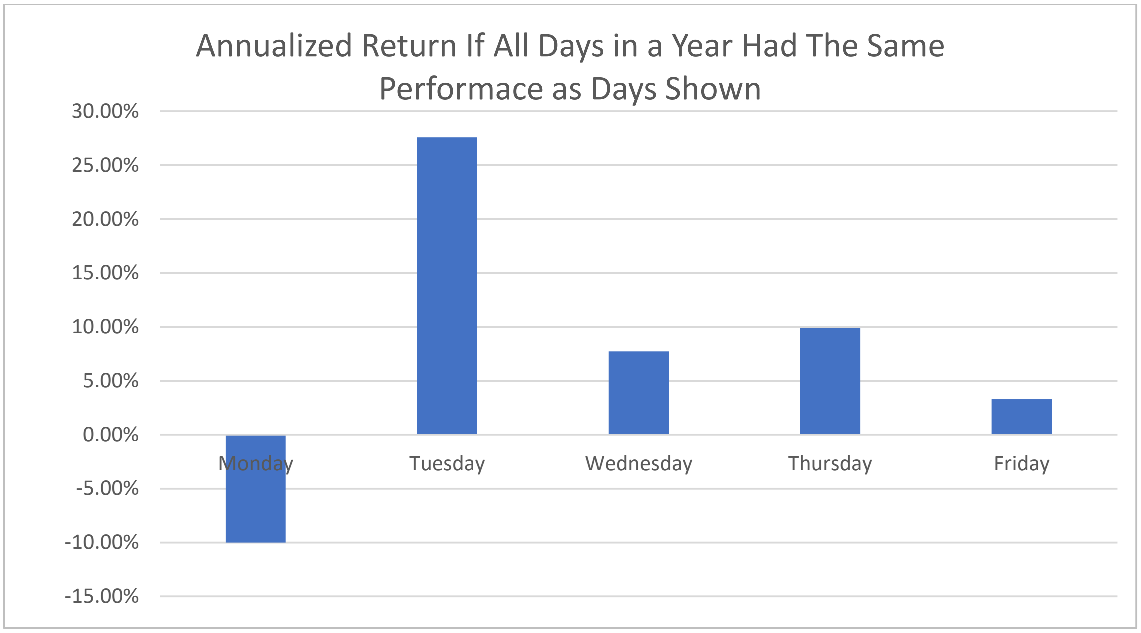


Exhibit 5 shows the output of an Ordinary Least Squares (OLS) regression utilizing five dummy variables to capture day-of-the-week effect. We ran the regression forcing the constant term to zero to predict average daily returns. The results indicate no overall significant difference among the average daily returns (Significance F = 0.19993).

Exhibit 5: Regression output for predicting daily returns using five dummy variables

	df	*SS*	*MS*	*F*	*Significance F*
Regression	5	0.001155137	0.000231	1.460362	0.199393557
Residual	4295	0.679463345	0.000158		
Total	4300	0.680618482			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A
Monday	-0.000416893	0.000428896	-0.97201	0.331098	-0.00126	0.000424
Tuesday	0.000962844	0.000428896	2.244934	0.024823	0.000122	0.001804
Wednesday	0.000294237	0.000428896	0.686033	0.49273	-0.00055	0.001135
Thursday	0.000373433	0.000428896	0.870684	0.383976	-0.00047	0.001214
Friday	0.000127619	0.000428896	0.297551	0.76606	-0.00071	0.000968

We also used ratio-to-moving-averages method and computed daily indexes for the five trading days. It is worthy of note that the sum of these five indexes should be exactly five. Days with computed indexes below or above 1, would signify below or above average daily returns respectively and indexes being exactly one would signify at the average daily return.

Exhibit 6 shows daily returns on Fridays and Mondays are below average, and Tuesdays, Wednesdays, and Thursdays enjoy an above average daily return.

Exhibit 6: Seasonal Indexes for Daily Stock Returns

Day of The Week	Monday	Tuesday	Wednesday	Thursday	Friday
Daily Indexes	99.93%	100.07%	100.00%	100.01%	99.99%

It is interesting to note that all correlation coefficients between any given trading day and the next trading day were negative. This effect is most pronounced between Mondays and Tuesdays (correlation coefficient = -0.28424). Exhibit 7 displays correlation coefficients matrix between the average daily returns of the 5 trading days.

Exhibit 7: Correlation Coefficients Matrix between the average daily returns of the 5 trading days

	Monday	Tuesday	Wednesday	Thursday	Friday
Monday	1				
Tuesday	-0.28429	1			
Wednesday	0.035944	-0.130075053	1		
Thursday	0.019595	0.039400677	-0.02674791	1	
Friday	-0.08127	0.116931276	-0.03861401	-0.14066	1

CONCLUSION

- Average daily equity market return during the period of January 2001 to December 2020 was lowest on Mondays and highest on Tuesdays.
- Average daily volatility of the equity market as measured by standard deviation during the period of January 2001 to December 2020 has been the lowest on Fridays and highest on Mondays.
- Daily indexes for Mondays and Fridays are below 100 percent, and conversely, for Tuesdays, Wednesdays and Thursdays are above 100 percent.
- There has not been a statistically significant difference among the average daily returns. In light of the fact that some literature in the past have shown a significant difference, it looks like that we are witnessing a diminishing day of the week anomaly.

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I. INTRODUCTION

Most U.S. universities went online during March of 2020 to protect students from the Covid-19 coronavirus. At the same time, university systems across the country offered Pass/Fail as an option to a letter grade for the course. This school year, there is more opposition to the policy. The College of Charleston decided to extend the deadline for withdrawing from a course instead of offering pass/fail. They experienced an increase of A's, B's, and C's when grades were compared to previous semesters. Some schools, such as North Dakota State University and the University of North Carolina at Chapel Hill, allowed students to declare Pass/Fail up to a November deadline but would not extend it (Flaherty, Nov. 30, 200). The actions beg the question: Why would university systems offer a Pass/Fail option? Is there a difference in learning online compared to learning in-person?

A recent newspaper article reported "Schools confront 'off the rails' numbers of failing grades" (Thompson, Dec. 7, 2020). She writes, "The first report cards of the school year are arriving with many more Fs than usual in a dismal sign of the struggles students are experiencing with distance learning." The article continues by listing reasons for the failures: students not completing all the work, spotty internet access, and Zoom cameras turned off during classes.

We believe there is a difference in taking a course online versus taking it in-person. An online class is rather like giving a student a textbook and a flashlight and locking him in a closet. At the end of the semester, voila! Some students have learned the material. The question is, would those students have done better in-person? The material is the same. The teacher is the same. Is there a difference in learning online compared to learning in-person?

We conducted a study prior to March 2020, that examined the differences in students who chose to take an online course compared to students who chose to take the course from the same instructor in-person. We found there were significant differences in the two groups of students. Factors that affected the student's final grade in the class included their GPA, their feeling of Self-Efficacy, level of Technical-Efficacy, Technical Frustration, Locus of Control and Lazy User characteristics. Our findings suggest that asking students to take online courses when they prefer in-person classes is an additional hardship.

II. LITERATURE REVIEW

Researchers remain unclear on whether online classes are appropriate and desirable. Xu and Jaggars (2011) found that community college students who take their first course online were negatively impacted. They also found significant differences in the students who chose to take the course online compared to those taking the course in-person. Their study suggested that any difference one would normally find between students in a classroom, is magnified when the course is online. There were differences in age, sex, race, and English as a second language. They also found a difference in students who took a computer literacy course prior to the online course compared to those who did not take a computer course. McLaren (2004) found that while online instruction can accomplish the teaching part and be an accredited method of fulfilling course objectives, not all students are equipped with the persistence factor. They found that students "who were more mature, highly motivated, independent, willing to ask questions, and well organized" (McLaren, 2004, p. 8) were more successful but the method of instruction can be used by all. However, they found that larger numbers of students dropped, disappeared from, or failed the online version of the course than from the in-person course.

Kirtman (2009) compared learning outcomes of three online master's courses with three in-person courses and found mixed results. In-person students scored higher on the mid-term exam but there was no significant difference between the groups on the final exam. Additionally, online students were very positive about the customizable learning experience because they did not have to look for parking and they could focus on the parts they did not know, instead of spending time listening to parts they did understand. Jayaratne and Moore (2017), found that one of the benefits of online learning was the time flexibility and because of this, "it was not advisable to deliver classes online synchronously which required students to take the class online on a fixed time schedule." Wagner et al. (2011) studied eleven online sections and nineteen in-person sections of a business software course. They found a significant difference in the course results of females (who scored higher) and males. Brown (2012) found that students said they preferred online courses, but grades were higher for traditional in-person sections. It appears that there are some differences in taking a course online and taking one in-person.

To understand which individual characteristic differences explain student performance in online or in-person classes, we surveyed students in six accounting principles sections, three online and three face-to-face, over two semesters. The in-person classes were larger. All were taught by the same instructor at a large, public, Southern university. Students selected an in-person or online course. All sections used the same web-based homework software assignments.

Many studies have examined the characteristics of successful students in face-to-face and online settings. Grades and GPA have been widely used to predict student success in both learning environments. However, while past performance is a strong predictor of future performance, it fails to provide agency to either educators or students to understand, predict, or improve performance. Literature suggests that psychological factors have an impact on a student's choice of taking a course online or in-person, as well as their success in the course. Ihm et al. (2013) examined Korean dental school students in-person classes and reported that higher self-efficacy was related to higher GPA grade scores. They found that in addition to GPA, students' locus of control and self-efficacy "were absolutely strong predictors of students' performance" (Ihm et al., 2013, p. 1618). O'Neill and Sai (2014) asked students why they *did not* take a psychology course online but elected to take it in person. One student responded, "I prefer going and sitting in a lecture room. I find I don't have the motivation to keep up to date with my work for an online class" (O'Neill and Sai, 2014, p. 9.)

Previous research on online learning has focused on student characteristics. Boyd (2004) identified characteristics of successful online students and found they included a level of computer competence, time, physical workspace, and familial support. In addition, he identified personal traits such as being self-motivated and self-disciplined as important determinants of success in online courses. He wrote, "One possible reason for the higher attrition rates among distance education students is that there may be only certain kinds of students under certain conditions who can successfully learn via the online format" (Boyd, 2004, p. 2). Vella et al. (2015) found that specific traits in web-based students predicted end-of-course grades including age, gender, instructional mode (using Blackboard or Moodle, posting videos or discussion boards, etc.) course level and whether the students were enrolled full-time or part-time. A study of online students by Artino and Stephens (2009) investigated the impact of the negative achievement emotions, boredom, and frustration, and found that lower levels of negative emotions were generally associated with higher grades. Artino (2010) followed this with a study of online or in-person learning. He found that students with higher levels of self-efficacy were more likely to take a course online. However, he also reports that students who are truly interested in the material, may choose to take the course in person. Artino and Jones followed this with another online learning study (2012) of frustration effects and reported that emotions seem to be intertwined with the student's self-regulating learning traits. So, there appears to be a lot of research in support of the view that individual characteristics play a role in successful online learning.

In the Fall of 2020, during advising for Spring 2021, the semester after everyone was sent home for Covid-19, the authors met with some students who reported excitement about continuing to have all courses online while other students withdrew, waiting for things to return to normal. One student was depressed and angry about not meeting face to face. Educators are scrambling to deal with all contingencies, especially since Scudellari (2020) predicts the future course of the virus means it will be around for another five years. And most predictions involving the virus include online education, though they also discuss the disparity in the availability of online access available to the poor compared to the wealthy (Basilaia and Kvavadzew, 2020). This is important because the students at out university are like students everywhere. They are forced to take classes online even though they prefer to learn face-to-face in person. For the Fall of 2021, our University President is calling for face to face meetings but has warned us that if cases of the virus are found on campus, we will return to online teaching.

From actual cases and studies of student online learning, we know that some people perform better in online courses than others. O'Neill's unknown student said it was motivation. McLaren mentioned persistence. Dictionary.com defines "persist" as "to continue steadfastly or firmly in some state, purpose, course of action, or the like, especially despite opposition, remonstrance, etc." Buzzetto-Hollywood et al. (2019) explored grit (persistence and perseverance) in online education and found that grittier students also reported more self-discipline and self-efficacy, but the study did not find a significant relationship between grit and success in an online course. However, there are other factors such as Frustration Tolerance that are similar to grit that do make a difference in online learning. Meindl et al, (2019) studied Frustration Tolerance and found a relationship between academic achievement and the ability to continue to work toward one's goal even though frustrating events occur to impede progress. Khanlarian and Singh (2015, p. 1) found "a stronger relationship between frustration and performance in online students." People who solved the problem, did not report frustration while people who could not solve the problem, reported being frustrated.

Our study investigated some differences in students who chose to take an asynchronous online class when an in-person class was also offered. Over two semesters, we surveyed 111 online accounting students and 257 in-person students who all had the same instructor. We found that here were significant differences between the two groups. We also found that self-efficacy, locus of control and frustration predict a student's final accounting course grade better than their GPA. We present evidence that highlights many differences during a semester between students who chose to take an online class and those who preferred to take it in-person. Educators have known that different students respond to various teaching styles, so it is not surprising to find that students respond differently to courses offered in different formats. We present factors that were found to have a significant impact on student performance in an accounting principles class that was taken in-person by some students and online by others.

Our objective is to enhance our understanding of factors that contribute to a student's performance in a class, be it online or in-person. We also hope to find which, if any, characteristics are different between the two groups. There must be some reason other than convenience that students take classes online when they have a choice of methods. This study examined the ability of Lazy User, Frustration Tolerance, Locus of Control, Self-Efficacy and Technical Efficacy to predict a student's grades in an in-person accounting principles class compared with student grades in an online class with the same instructor.

III. THEORETICAL FOUNDATIONS OF PREDICTING STUDENT SUCCESS

Grade Point Average

Many scholars have tried to find a way to predict student success. A recent study of educational literature (York, Gibson, and Rankin, 2015) found that GPA (grade point average) was the most used measure to predict student success. Eskew and Faley (1988) examined students in a first college-level financial accounting course and developed a model to explain the final course grades. They found that SAT scores, high school grades and previous accounting experience were significant in predicting the ending course grades. Tross et al. (2000) found that high school GPA and SAT scores were related to college GPA but also found that conscientiousness (a measure of homework completion, note taking and on time submission) was more predictive of college GPA than their high school GPA was. Palocsay and Stevens report that in a predictive model, student GPA was the most important predictor of exam performance when using web-based homework (Palocsay and Stevens, 2008). A more recent study found that GPA is highly reliable as a measure of student performance but differs moderately depending on the students' area of study (Beatty et al, 2015). They reported that GPA can be used as an indicator for student performance on licensing exams, such as the CPA exam. The 2018 study by Tepper and Yourstone reported that a student's performance in introductory accounting is affected by GPA as well as the student's self-efficacy.

Self-Efficacy

Bandura believed that self-efficacy played a central part in a person's success. He wrote, "the strength of people's convictions in their own effectiveness is likely to affect whether they will even try to cope with given situations" (1977, p. 193). The theory suggests that people receive feedback on their performance which causes them to reevaluate and try, or not try, again. Self-efficacy has been studied so often that a "Bandura self-efficacy theory" Google Scholar search returns 38,800 results just since 2016. One notable study, Williams, and Williams (2010) used math self-efficacy to predict math class achievement in a recursive model of reciprocal determinism in 33 nations.

Frustration

Bessier et al. (2002) studied "frustration in computer usage". Frustration is that feeling one has when progress towards a goal is impeded by an outside force such as a printer that won't print or online homework software that says "0" is wrong because it wants you to enter "0.0". But another study by Meindl et al. (2014) uses the term "frustration tolerance" meaning the amount of frustration one can take without quitting. They had participants spend five minutes trying to complete a mirror image tracing pattern on a computer that was rigged to fail. The student's frustration tolerance predicted college progress among those students.

Locus of Control

Rotter (1954) studied Locus of Control or the degree to which people believe they have control over their lives and their actions. A person with an internal locus of control believes events in their lives have occurred as results of their own behavior while people with an external locus of control believe that events will occur no matter what they do to cause or prevent them. Rotter also believed that people with an internal locus of control count on their own drive and determination to get them where they want to go, but people with an external view believe that nothing they can do will change what is going to happen to them. Albert and Dahling (2016) found a significant relationship between locus of control and academic self-concept. Drago et al (2018) found a significant relationship between Locus of Control, Academic Self-Efficacy and tutoring on a student's GPA. Hosseini et al. (2016) found a significant relationship between locus of control and academic achievement.

Lazy User

The lazy user was first described in a laboratory where mice that were familiar with their maze, started cutting corners to get to the food faster. In our context, the lazy user is one who uses the least amount of effort to complete a task. The lazy user model of solution selection suggests a person tries to fulfill a need by selecting from the options available to him, the option that best fulfills a need with the least amount of effort. This theory is appropriate since students in the classes were asked to use web-based homework grading software and some of them attempted to game the system by checking answers and using hints and seeing how examples are worked without actually reading the chapter or doing the work. "The lazy user theory of solution selection tries to explain how an individual (user) makes her selection of solution to fulfill a need (user need) from a set of possible solutions (that fulfill the need). The set of possible solutions is a subset of universal solutions that is constrained (limited) by the user state (circumstances)" (Tetard and Collan, 2009).

Technical Efficacy

Technical efficacy is the strength of one's belief in an ability to use technology successfully. In this century, everyone is expected to know and use certain technologies, some of which are proprietary to a business. Decker (1999, p. 162) wrote:

> "…employee self-efficacy perceptions of technological advancements are reflected in the performance and proficiency realized by the organization. Workplace performance and the employee's willingness to learn computer technologies and their related tasks are hindered by low self-efficacy levels. Consequently, attention to providing technical workforce preparation that transfers or results in self-efficacious computer technology interaction is a necessity."

Decker found that people who have had training, who have a computer at home, use a computer on the job, and are asked to train others have a higher level of belief in their own technical abilities, known as technical efficacy. However, Swingle (2012) observed students and their level of computer self-efficacy as related to online course success and concluded that there was **no correlation** (our emphasis) between academic success online and technical efficacy.

IV. METHODOLOGY

We began by separating the online students from the in-person students. Using SPSS, we found there were some significant differences in scores for the first set of homework grades (the average of three homework assignments using online homework grading software), the first test, the second set of homework grades, and the final exam (third test) grades (Table 1). The online group showed higher average Homework #1 and higher Test #1 scores, but the in-person group showed higher Homework #2 and higher Final Exam grades.

We asked students to complete this survey three times during the semester: the beginning, the middle, and the end of the term. We divided the responses into the in-person group and the online group. Using SPSS, we tested to see if there were any significant differences in the two groups. A one-way ANOVA (analysis of variance) is a statistical test used to examine the difference in means of two independent variables. We tested to determine if there was a difference in responses between the online group and the in-person group. The results appear in Table 1. We first tested the GPA of the two groups and found no significant difference. But we did find differences in scores on Homework 1, Test 1, Homework 2, and the final exam.

V. ANALYSIS OF DATA

The Independent Samples t-test looks at the means of two different groups to determine if there is statistical evidence to support the idea that the means of the two populations are significantly different. Using SPSS, we found that there was no significant difference in the means of the GPA of the in-person group compared to the online group as shown in Table 1.

Insert Table 1 about here

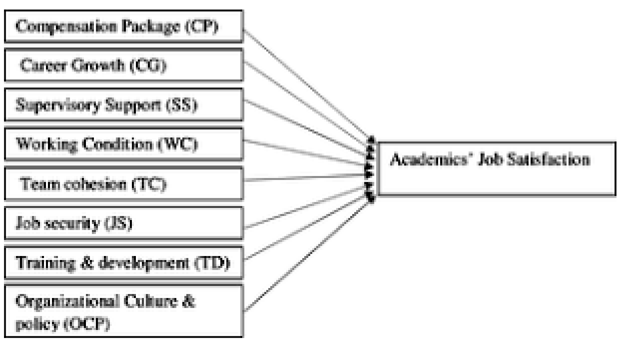
Table 1: Differences in In-Person Group and Online Group (GPA, Homework, Tests and Exam)

Next, we analyzed the survey responses. There were 64 questions in the survey, and it was administered three times. Therefore, we worked with 192 questions. We only show here the questions that produced significantly different responses between the two groups. We first show the questions in Table #2 and then the differences in Table #3.

INSERT TABLE #2 ABOUT HERE

Table 2: Survey questions that produced significantly different responses.

A construct is a trait or ability that is measurable in a person and to which we can link a performance outcome (Cronbach and Meehl, 1955, p. 283). Constructs are used to help us understand human behavior. For example,



An example of a construct is the oft measured trait called "job satisfaction". It is believed to be determined by five factors: engagement, respect (praise and appreciation), fair compensation, motivation, and life satisfaction. Over the years, studies have demonstrated that people who perform well are generally happier with their jobs. But they also found that it doesn't necessarily work the other way… being happy doesn't make them perform better. Studies show that satisfaction influences performance more than performance influences satisfaction. A person who is happy at work does a good job but doing a good job doesn't always make them happy at work (Locke, 1969; Smith, Kendall, & Hulin, 1969).

Our constructs are ___________________

INSERT TABLE #3 ABOUT HERE

Table 3 - Online Students: Measuring Significant Constructs' Reliability and Validity using SmartPLS based on Survey Questions

INSERT TABLE #4 ABOUT HERE

Table 4 – In-Person Students: Measuring Significant Constructs' Reliability and Validity using SmartPLS based on Survey Questions

Constructs are generally evaluated on certain measures: Cronbach's Alpha which should be greater than .7; Rho A which should be greater than .7; Composite Reliability (a measure of the quality of a construct) which should also be above .7 and the Average Variance Extracted which should be above .5, all of which are presented in Table 3. All the questions show acceptable values (though red values are low, they improve by the third time they are asked). We found significant differences in these constructs from the two groups. Table 4 shows the results from the in-person students.

Based on these findings, we used Warp-PLS to create a structured equation model and ran it once with the online group's responses and again with the in-person group's responses. We found significant differences in the models.

INSERT FIGURE #1 ABOUT HERE

Figure 1: In-Person PLS Full Model with GPA

INSERT FIGURE #2 ABOUT HERE

Figure 2: In-Person PLS Model only using GPA, Y1 and Y2 as predictors

INSERT FIGURE #3 ABOUT HERE

Figure 3: In-Person PLS Model without GPA

INSERT FIGURE #4 ABOUT HERE

Figure 4: Online PLS Full Model with GPA

INSERT FIGURE #5 ABOUT HERE

Figure 5: Online PLS Model only using GPA, Y1 and Y2 as predictors

INSERT FIGURE #6 ABOUT HERE

Figure 6: Online PLS Model without GPA

V. DISCUSSION

Why is there such a difference in the explanatory power of the models? Both models always show the links between Lazy User and Frustration as $p<.01$; links between Frustration and Self-Efficacy as $p<.01$; and the links between Locus of Control and Self-Efficacy as $p<.01$ as well. However, the in-person group shows the strongest relationship between Self-Efficacy and the Y-variable at time T-1 while the online group shows the strongest relationship between Self-Efficacy and the Y-variable at time T-2. At time T-3, the relationship between Self-efficacy and Y3 reports $P=.05$ for the online group but the in-person group reflects that $P=.14$ which is not significant and a little hard to explain.   It suggests that the model is a better representation of the online group than the in-person group.

That leads to the only other unexplained construct, Technical-Efficacy, a moderator of Self-Efficacy. Decker (1999) found that performance in the workplace by employees required to use a new technology, is affected by low Self-Efficacy. We, too, found that Technical-Efficacy affected Self-Efficacy and wonder if asking students who are known to have low Self-Efficacy to learn a new technology while learning new material isn't a formula for failure? On the other hand, we have to ask, was it the student's level of Self-Efficacy which prompted him or her to take an online course? (We acknowledge that some students would NOT have had a choice…. That they took the class which was offered during a particular time or because a roommate was taking it, but that question was not included in the questionnaire.) Thus, we would suggest more computer training before letting students take online courses. Even though all business majors must learn Excel before taking upper-level classes, as teachers, we still see students turning in spreadsheets with no formulas – just answers.

A moderating variable is one that affects the relationship between two other variables by changing the strength or effect of the interaction of two variables. Technical Efficacy shows a significant relationship between Self-Efficacy and the student's grades of P=.05 at time T-2 only in the in-person group. But the online group shows a significant relationship between Self-Efficacy and Technical-Efficacy at times T-1 (P<0.01) and T-3 (P<0.02).

If the models reflect a difference in the moderating effect of Technology, this makes sense. We know that education makes a difference in life. Why wouldn't a student's feelings about technology affect their use of online homework technology and their success in the class? We would not expect a student to go to an accounting class and understand while being taught in French, but we expect students to understand and use technology in every class. AACSB standards are calling for increased use of technology in data analytics. These models demonstrate that there could potentially be hurdles for students who are less trained in basic computer systems.

Our findings also created a model that explains a student's final grades better than GPA alone, but only for the online students. For the in-person group, there is very little difference in the R^2 of the model without their GPA and the model with their GPA. Is it possible that Self-Efficacy, Locus of Control, Frustration and Lazy User are some of the main factors that make up GPA? The result is even stronger for the online group. The R^2 for the GPA alone is .45 but it grows to .49 using the factors without the GPA. Finally, the entire model predicts the final grade with an R^2 of .53 when all factors are included. (We used SmartPLS software to create a model and recreated it using WarpPLS. R-square values of 0.19 are weakly predictive while 0.33 is moderately predictive and 0.67 is substantially predictive (Hubona, 2010).

In June of 2020, the Charles Koch Foundation and *College Pulse* surveyed 5,000 full-time undergraduates from 215 different universities and report that while most students believe their university did an adequate job of moving courses online during the pandemic, the majority of them thought it could have been better (Small, 2020). The article quotes Ryan Stowers of the Charles Koch Foundation: “Online learning has tremendous promise as a tool to help institutions scale high-quality education. This survey makes clear that while many students still prefer in-person learning, the pandemic is creating a renewed sense of urgency among both students and instructors to implement technologies that can facilitate more effective remote learning.”

This suggests that the North Carolina system may have been correct in allowing students to opt for the Pass/Fail in the spring of 2020 during the Coronavirus. But it also shows that perhaps they should have continued to allow the Pass/Fail option in the fall semester as well.

VI. CONCLUSION

There are several imitations in this study. The survey was given several years ago and focused on finding differences in the students’ use of homework-grading software. A future study should include a question that asks for the reason the student decided to take a course online. Another factor is that accounting is a difficult course for many students. The university typically has a 25% D, W or F rate for these classes. We only used survey data from students who completed the course, so we assume we lost some important data from students who quit. However, the results of our study provide evidence-based guidance in the future use of online education.

This study uses theory to attempt to understand the significant relationships that are apparent in our findings – that student characteristics including their feelings about their use of technology and their ability to use it, are significant indicators of their successful completion of an online course. Our data was collected before the Covid-19 pandemic, but the results lead us to believe that all the parents who are unhappy with their children learning online probably have just cause. Not everyone is made to excel while taking an online course, which is what drove our research. We find that there is a significant difference in the students who choose to take an online course compared to students who choose to take an in-person class. Therefore, it seems appropriate for any university system to offer a Pass/Fail option during these frustrating, Covid-19, tension-producing times.

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Table 1: Differences in In-Person Group and Online Group (GPA, Homework, Tests and Exam)

Difference in Means: In-Person group compared to Online Group	**Significance level (2-tailed)** **(Highlights indicate significance)**	**Mean: In-Person Group**	**Mean: Online Group**
GPA (1=A, 2=B, etc.)	0.5250	3.13	3.22
Homework 1 (out of 100 points)	0.0250	91.860	95.460
Test 1	0.0040	76.374	80.931
Homework 2	0.0230	90.020	85.950
Test 2	0.2060	76.374	74.444
Homework 3	0.1240	90.023	85.221
Final Exam	0.0410	88.486	76.523

Table 2: Survey questions that produced significantly different responses.

Selected Survey Questions		
Self-Efficacy	#1	I can complete homework assignments successfully
	#2	When I work accounting problems using the web-based homework software, I can get the right answers.
Locus of Control	#5	Chance or luck plays an important part in my success when using the web-based homework software
	#6	Doing well in school is a matter of hard work. Luck has little or nothing to do with it.
	#7	Doing well on my homework using the software is a matter of hard work. Luck has little or nothing to do with it.
	#8	My problem-solving skills are better than those of other students in this class
Frustration	#1	I feel anxious when I run into a problem on the computer or have a problem with the web-based homework software.
	#2	I feel helpless when I encounter a problem on the computer or have a problem with the web-based homework software.
	#4	Frustrating experiences with the web-based homework software severely impacted my ability to get the assignment completed.
Usefulness	#1	Using web-based homework software enables me to finish the homework assignment faster than if I used paper
	#2	Web based homework software has improved the quality of the work I do compared to paper homework
	#3	Web based homework software gives me greater control over my work compared to paper homework
Technical Efficacy	#1	I tried to discover new functions in the web-based homework software (calculator, hints, etc.?)
	#2	If I heard about a new information technology, I would look for ways to experiment with it
	#3	Using a computer is an efficient way for me to learn new things

Table 3: Online Students: Measuring Significant Constructs' Reliability and Validity using SmartPLS based on Survey Questions

Construct	Cronbach's Alpha (Should be >.7)	Rho_A (Should be >.7)	Composite Reliability *Internal Consistency* (Should be >.7)	Average Variance Extracted (AVE) (Should be >.5)
Frust1	0.769	0.805	0.861	0.675
Frust2	0.760	0.801	0.859	0.672
Frust3	0.827	0.859	0.895	0.739
LOC1	0.695	0.695	0.814	0.522
LOC2	0.792	0.842	0.859	0.608
LOC3	0.805	0.854	0.865	0.619
Lazy1	0.667	0.668	0.818	0.600
Lazy2	0.715	0.731	0.840	0.637
Lazy3	0.756	0.806	0.858	0.671
SE1	0.772	0.786	0.897	0.814
SE2	0.750	0.758	0.889	0.800
SE3	0.826	0.828	0.920	0.852
Tech1	0.671	0.471	0.717	0.501
Tech2	0.705	0.277	0.742	0.516
Tech3	0.719	0.743	0.843	0.645

Table 4: In Person Students: Construct Reliability and Validity

Construct	Cronbach's Alpha Should be >.7	Rho_A Should be >.7	Composite Reliability	Average Variance Extracted (AVE) Should be >.5
Frust1	**0.789**	**0.819**	**0.875**	**0.701**
Frust2	**0.719**	**0.769**	**0.836**	**0.631**
Frust3	**0.818**	**0.830**	**0.891**	**0.732**
LOC1	0.743	0.746	0.839	0.565
LOC2	0.712	0.721	0.821	0.535
LOC3	0.756	0.775	0.843	0.575
Lazy1	**0.617**	**0.708**	**0.784**	**0.561**
Lazy2	**0.597**	**0.755**	**0.756**	**0.540**
Lazy3	**0.720**	**0.862**	**0.832**	**0.636**
SE1	0.682	0.686	0.862	0.758
SE2	0.758	0.770	0.892	0.805
SE3	0.826	0.829	0.920	0.852
Tech1	**0.661**	**-0.870**	**0.245**	**0.294**
Tech2	**0.667**	**-0.651**	**0.336**	**0.306**
Tech3	**0.737**	**-5.973**	**0.636**	**0.429**

Figure 1:

In-Person: Full Model With GPA

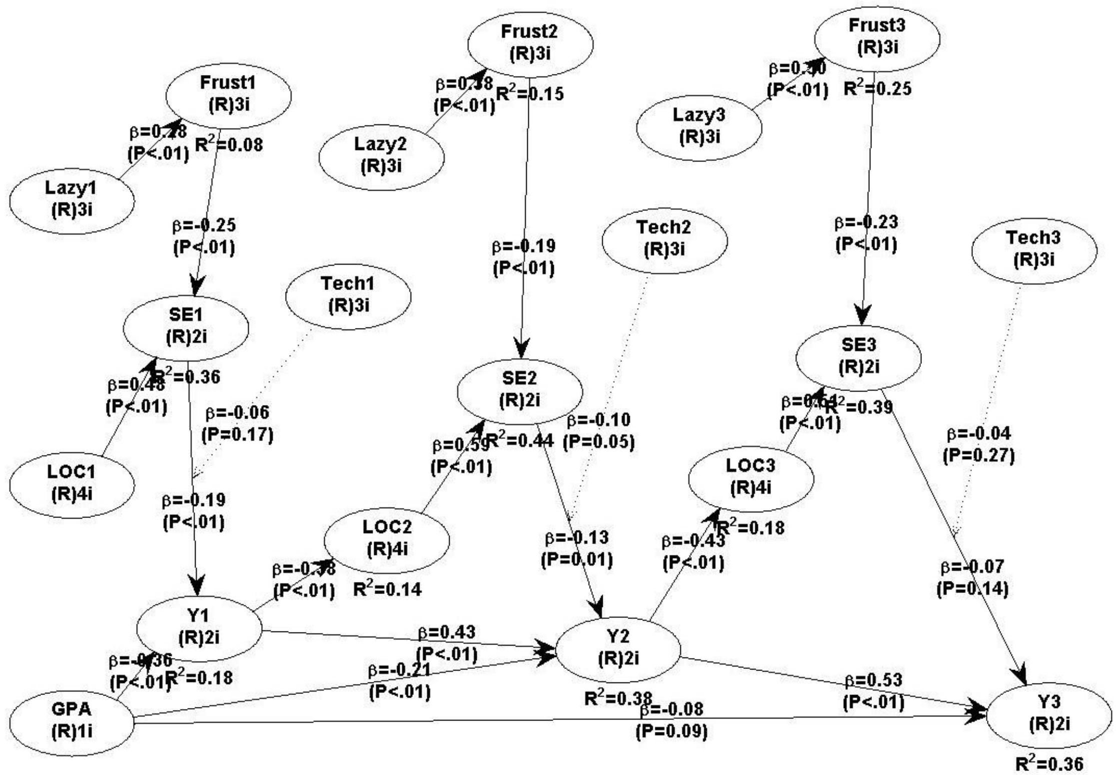


Figure 2: In-Person: GPA, Y1 and Y2 as only predictors

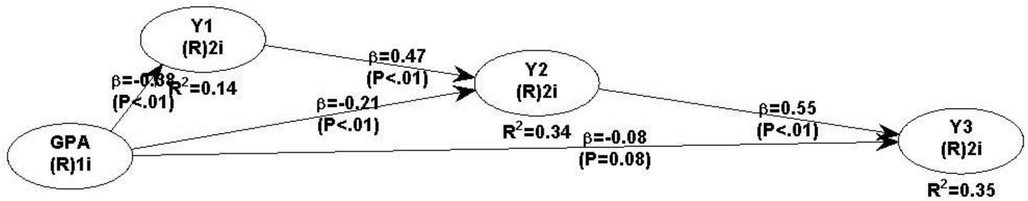


Figure 3: In-Person: Factors without GPA

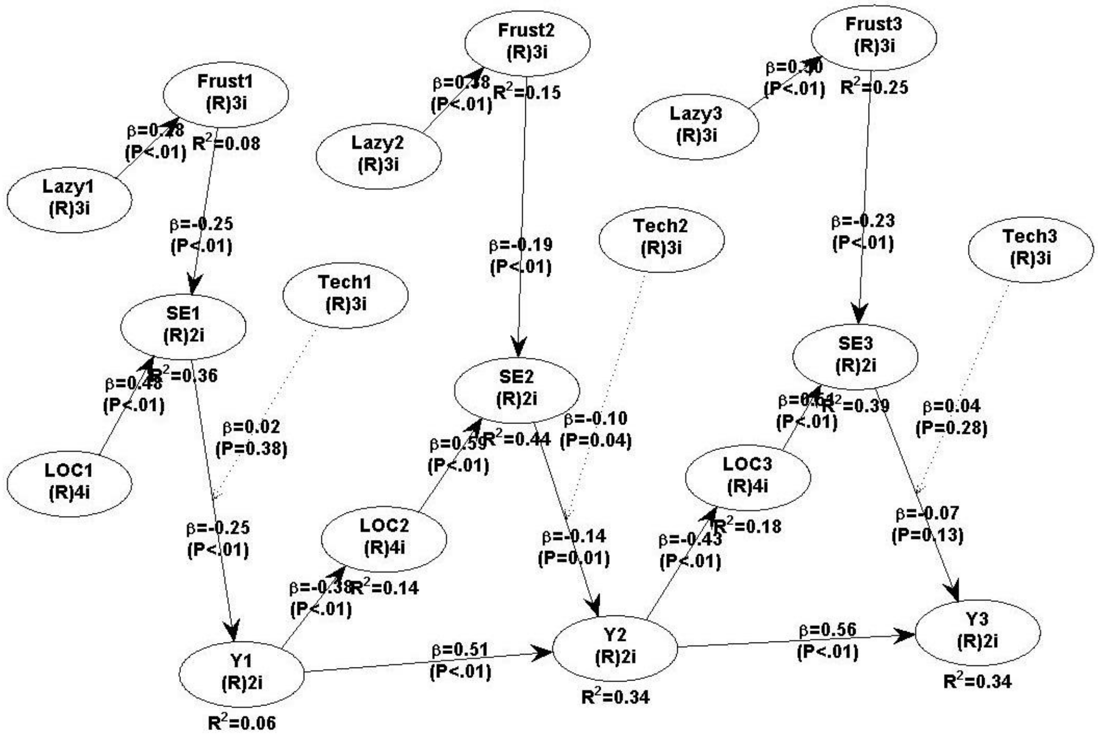


Figure 4:

Online Students: Full Model With GPA

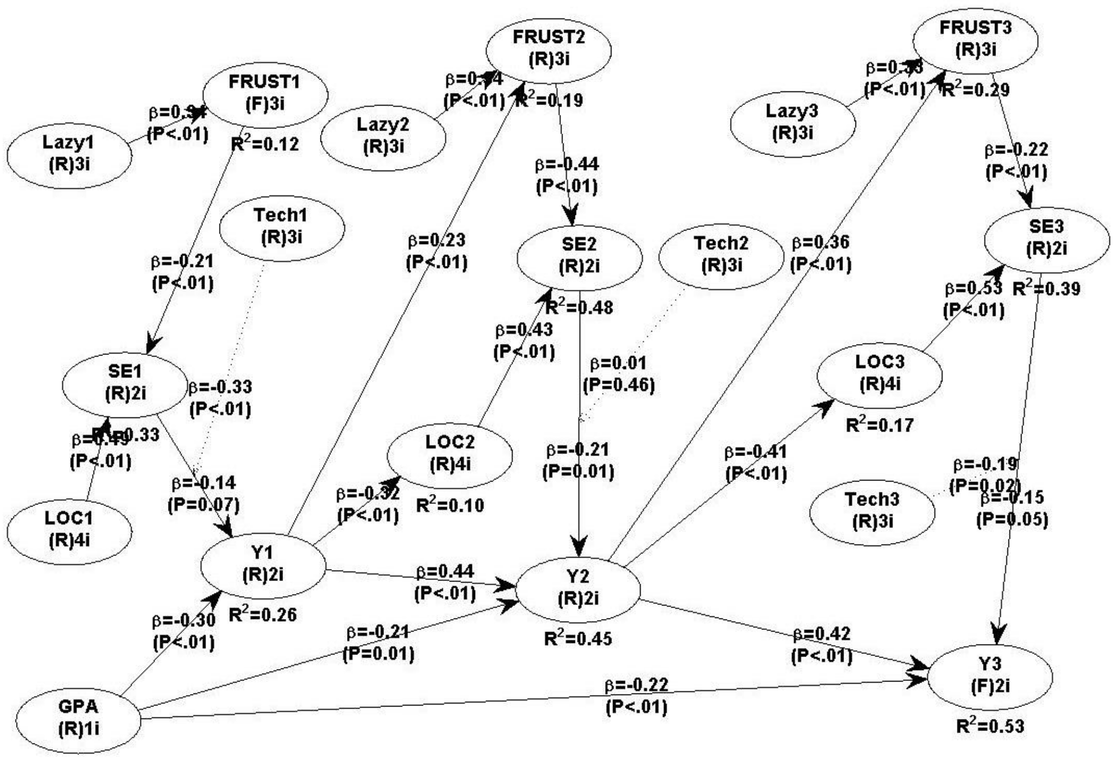


Figure 5:

Online Group: GPA, Y1 and Y2 as the only predictors

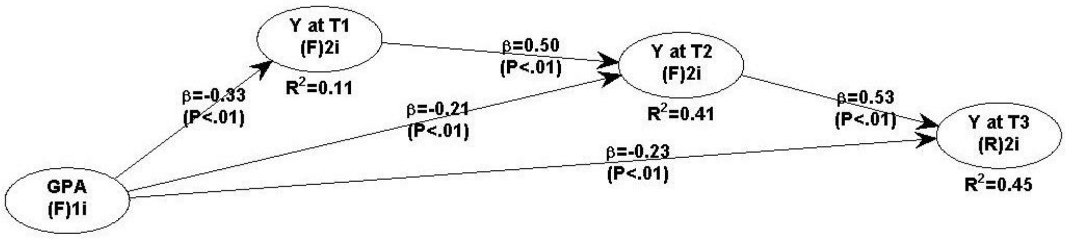
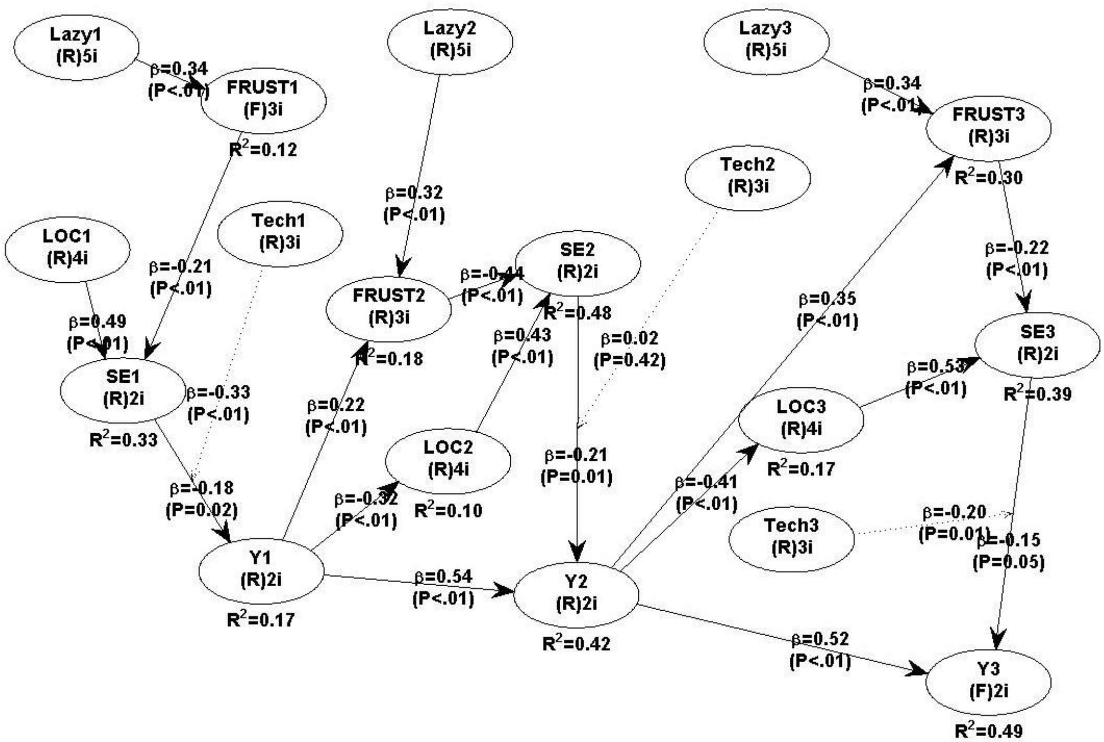


Figure 6:

Online Group: Full Model Without GPA



ESTIMATED IMPACT OF COVID-19 ON EXCHANGE RATE RISK OF MULTINATIONAL ENTERPRISES OPERATING IN EMERGING MARKETS

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ABSTRACT

Multinational enterprises (MNE) operating in emerging countries are exposed to various types of risk. Exchange rate risk is an important and anticipated part of MNE's total risk exposure, with a variety of tools available to mitigate that risk. In this study, we focus on transaction exposure of cash flows in eight distinctive emerging market currencies and employ the Modified Value-at-Risk (MVaR) model to estimate the maximum one-period loss during an eighteen-month period spanning pre- and post-Covid-19 periods. The predicted losses by MVaR are then compared to the ex-post results, to identify any differences in the pre- and post-Covid-19 periods and to determine the need for adjustments in hedging strategies by MNEs during similar global crises. The motive of this research is to understand the limitations of hedging and what can MNEs do to mitigate transaction exposure risk. The results provide insights on whether MNEs should hedge their currency risk or not. The COVID-19 pandemic did impact all firms globally so this study is relevant and pertinent as firms plan their post-pandemic growth.

INTRODUCTION

Multinational Enterprises (MNEs) are business organizations that operate in multiple countries. MNEs engagement in the international arena exposes them to additional types of risk in comparison to domestic corporations. An important risk factor facing MNEs is the exchange rate risk. The exchange rate risk may be particularly significant for MNEs operating primarily in emerging markets.

Since majority of MNEs operate in multiple emerging countries, their currency risk exposure will be subject to the transaction exposure of their currency portfolio (cash inflows as well as outflows in different currencies). The volatility and co-movements of these currencies are known to be instable over time. With the tremendous growth in the foreign exchange transaction volume over the last four decades, as well as the growing volatility of foreign exchange rates in the floating exchange rate era proper management of currency exchange rate risk is an extremely important part of MNEs overall risk management strategy.

Table 1 illustrates the growth of the foreign exchange market over the last four decades, indicating the growth in the average daily global foreign exchange transaction volume was from $.14 trillion in 1985 to $6.6 trillion in 2019. With free trade blocs and pacts between various countries across the world, the just-in-time integration of supply chains across all industries, daily forex trading volumes will continue to increase. Globalization and free movement of goods will spur even more foreign exchange risk management for MNEs.

In order to manage their exchange rate risk, MNEs attempt to quantify the exchange rate risks they face, and implement hedging techniques using a variety of financial market tools to minimize these risks. A widely used method to quantify the transaction risk associated with flexible exchange rates is the traditional "value-at-risk" (VaR) approach. The VaR approach computes a specific dollar value on the downside risk (i.e., the maximum likely loss) an MNE will face over a specific time period at a particular confidence level. An important deficiency of the VaR model is its assumption that exchange rate movements follow a normal distribution and reliance on historical standard deviation of exchange rate movements in estimating the maximum loss. In this study, we utilize the "modified" value-at-risk, (MVaR) approach, which considers the skewness as well as the excess kurtosis and/or absolute kurtosis of the exchange rate movements, resulting in a more reliable risk estimate.

Table 1: Milestones of Daily Foreign Exchange Transaction Volume Globally

Year	In $ trillion
1985	$ 0.14
1995	$ 1.00
2006	$ 2.00
2010	$ 4.00
2014	$ 5.00
2019	$ 6.60

Source: Bank of International Settlements (BIS), December 11, 2019

The Covid-19 pandemic revealed the chinks in the armor of global trade. With trade routes shut down and export controls, many countries were short of critical medical supplies and emergency goods. Our study is the first to analyze possible changes in MNE's transaction risk in emerging markets during the pre- and post-Covid-19 periods. The pandemic driven disruption to economies might induce greater exchange rate volatility and related co-variances among currencies. This will have a measurable impact on transaction risk. We study the eight major emerging countries' currencies during the eighteen months before and the eighteen months after Covid-19 using the MVaR approach to quantify predicted losses and then compare these predicted losses with the actual/ex-post results. This study enables MNEs to minimize potential losses by determining which particular currency portfolios (i.e., combinations of currencies) have the least/most transaction risk. The results provide insights on whether MNEs should hedge their currency risk or not. The COVID-19 pandemic did impact all firms globally so this study is relevant and pertinent as firms plan their post-pandemic growth.

Justification of this study

Globalization, integration of supply chains and numerous inter-country trade pacts have led to an explosive growth in the foreign exchange trading. Table 1 shows how daily forex trading volume has increased over time. This massive trading volume has increased volatility in emerging markets as evident from the multiple currency crises such as Asian economic crisis in 1997, Russian, Mexican, Argentinian and many other countries inflationary currency defaults over the past three decades. MNEs operating in such volatile markets must hedge their currency risks to secure their financial positions. There have been no comprehensive studies of the "modified" value-at-risk (MVaR) measure. Our study compares the maximum expected losses with the actual currency losses over this particular post-Covid-19 crisis period for emerging markets' currencies. A comparison of these findings with the pre-Covid-19 findings will have significant practical implications for MNEs and even mid-sized US firms that have significant revenues and/or expenditures across different emerging markets' currencies. The results of this research will provide meaningful insights for MNEs to determine their hedging strategy. Hedging currency risk is quite expensive and firms have to weigh the expected benefits and costs of hedging. Our study will help in making these difficult yet necessary decisions for MNEs. While there are a variety of tools available to mitigate and/or eliminate the exchange rate risk, there are instances where firms may benefit from the decision not to hedge, if they anticipate exchange rate movements in their favor.

BACKGROUND / LITERATURE REVIEW

Cayton, Mapa and Lising [4] show that VaR has become an increasingly popular way for financial institutions to measure the risk of holding assets in multiple currencies. Mohammadi and Akhtekhane [8] estimate the risk associated with the U.S. dollar/rial exchange rate using VaR. Mabrouk and Aloui [7], Rejeb, Salha and Rejeb [9] and Khazeh and Winder [6] also employ VaR methodology to estimate the exchange rate risk associated with multiple currencies and currency portfolios. Artzner, Delbaen, Eber and Health [2] were first to explore the concept of conditional VaR. Additional studies on MVaR include Kaut, Wallace and Zenios [5], Basak and Shapiro [3] and Alexander and Baptista [1].

While the previous studies mostly focus on the risk exposure of individual currencies using daily percentage changes, standard deviations and VAR of the aforementioned currencies, we focus on the MVaR of individual emerging market currencies as well as currency portfolios. In addition, we offer the first study comparing the risk profiles of emerging market currencies in the pre- and post-Covid-19 periods via the MVaR method as well as the actual ex-post results.

DATA

For the pre-Covid period in this study we select the eighteen-month period preceding the acknowledgement by the World Health Organization (WHO) of a transmissible respiratory virus epidemic in Wuhan, China on December 31, 2019. (i.e. July 1, 2018 to December 31, 2019). The post-Covid period includes the 18 months following the recognition of Covid-19 by WHO (i.e. January 1, 2020 to June 30, 2021. Both the pre- and post-Covid period selected are eighteen months in duration. We use the daily exchange rates data from the Federal Reserve Bank database.

The following eight emerging market currencies were considered in this study. Brazilian real (BRL), Indian rupee (INR), Korean won (KRW), Malaysian ringgit (MYR), Mexican peso (MXN), South African rand (ZAR), Taiwanese dollar (TWD) and the Thai baht (THB). The eight countries constitute a significant portion of emerging market GDPs. China has been excluded from this study as the Chinese yuan is tightly managed to float within a particular price band. This artificial control of the currency makes it less volatile and less relevant to this study.

Figures 1 & 2 provide minimum & maximum daily percentage change for the selected emerging market currencies during pre- and post-Covid-19 periods respectively.

Among the selected emerging market currencies, the South African rand has the greatest range in daily percent change during the eighteen-month pre Covid-19 period (2.51% to -3.95%). The Brazilian real also shows significant volatility, with maximum daily increase in value of 3.99%, and a maximum daily loss of 2.13%. On the other end of the spectrum, the Malaysian ringgit had the smallest range of these eight different currencies (.88% to -.72%), closely followed by the Taiwanese dollar (1.68% to -.79%) and the Thai baht (1.20% to -1.33%).

In comparison during the post Covid-19 period, the Mexican peso has the greatest range in daily percentage change (5.47% to -5.02%) closely followed by the Brazilian real (3.80% to -4.40%), while the Thai baht had the lowest range (.86% to -1.03%) closely followed by the Taiwanese dollar (1.00% to -1.20%).

FIGURE 1: MINIMUM & MAXIMUM DAILY PERCENTAGE CHANGE FOR EMERGING MARKET CURRENCIES (PRE-COVID JULY 2018 – DECEMBER 2019)

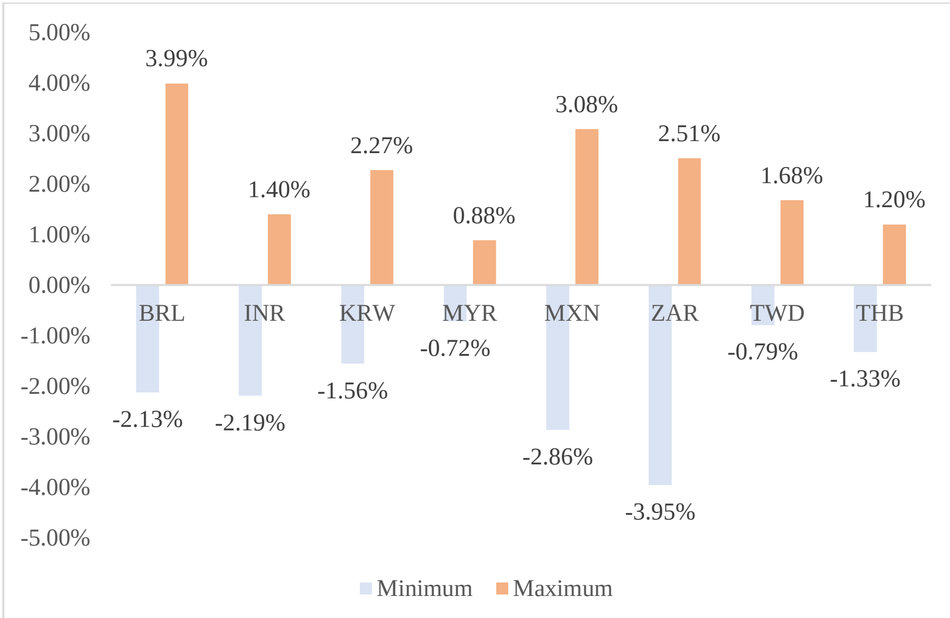
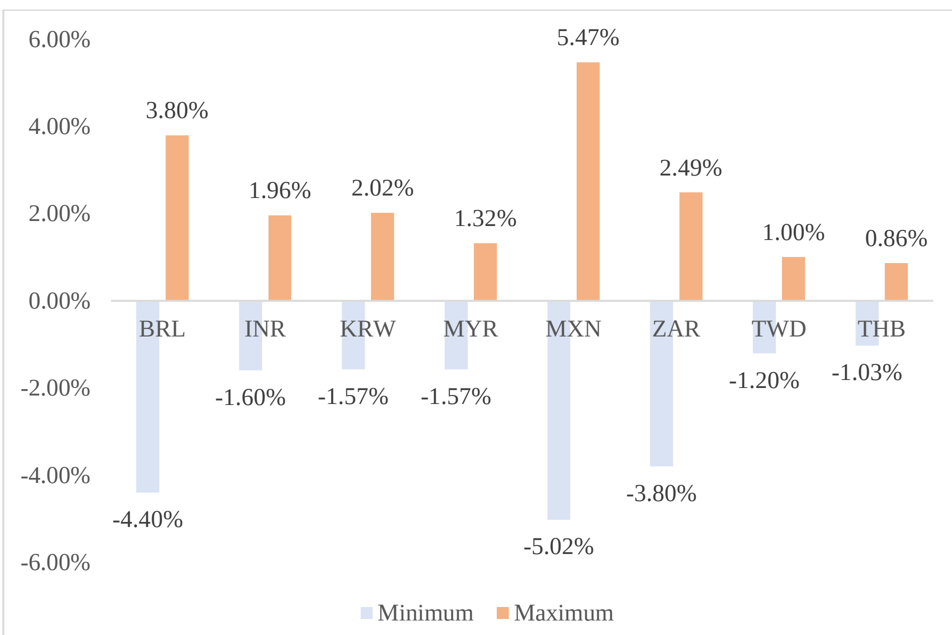


FIGURE 2: MINIMUM & MAXIMUM DAILY PERCENTAGE CHANGE FOR EMERGING MARKET CURRENCIES (POST-COVID JANUARY 2020 – JUNE 2021)



Figures 3 & 4 provide standard deviation of the selected emerging market currencies based on daily percent changes during the pre- and post-Covid -19 periods.

FIGURE 3: STANDARD DEVIATION OF EMERGING MARKET CURRENCIES (PRE-COVID JULY 2018 – DECEMBER 2019)

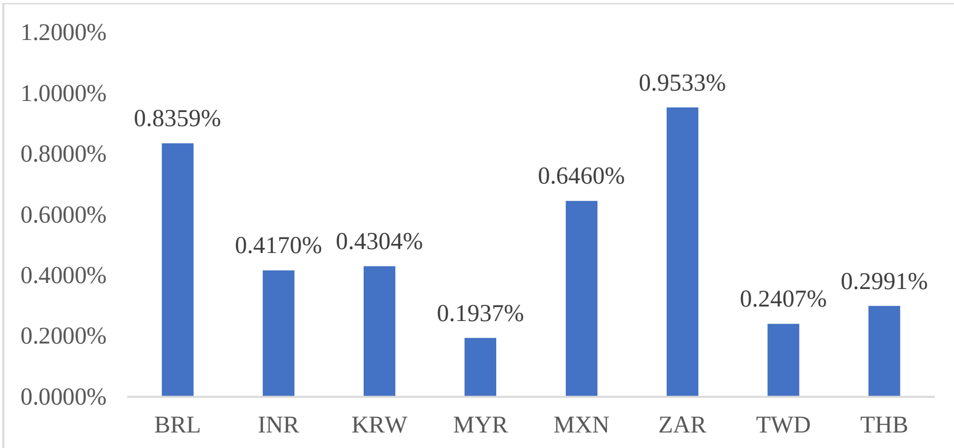
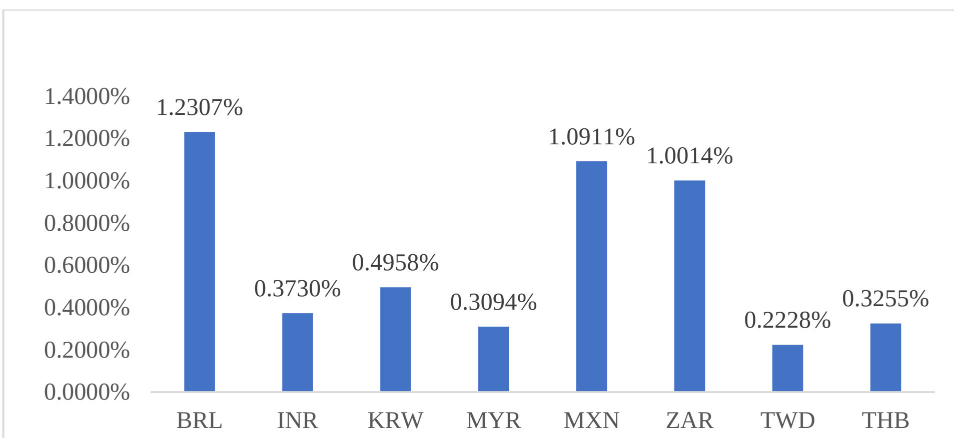


Figure 3 above shows that during the pre-Covid period, the Malaysian ringgit had the lowest standard deviation (.1937%) of daily percent change while the South African rand had the highest (.9533%) standard deviation of daily percent changes among the eight emerging market currencies.

FIGURE 4: STANDARD DEVIATION OF EMERGING MARKET CURRENCIES (POST-COVID JANUARY 2020 – JUNE 2021)



During the post Covid-19 period, the Brazilian real has the highest standard deviation of daily percent changes at 1.2307% while the Taiwanese dollar was the most stable with a low standard deviation of .2228%. The standard deviation of the daily percent changes has increased for six of the eight currencies in the post-Covid-19 period, indicating the emerging market currencies have become more volatile during the post-Covid-19 period. Only the Indian rupee and Taiwanese dollar show slightly reduced volatility in the post-Covid-19 period. The Brazilian real and the Mexican peso show the largest increase in standard deviation from the pre-Covid to post-Covid period.

METHODOLOGY

In this study, the results for the maximum 1-period holding period loss for an individual currency "i" or for a portfolio of currencies "p" is

$$E(e_t) – (Z) \text{ x } (\sigma_{i \text{ or } p}) \qquad (1)$$

where $E(e_t)$ is the expected percentage change in the currency's value for the relevant period

The results for the modified maximum 1-period holding loss for an individual currency "i" or for a portfolio of currencies "p" can be estimated using

$$E(e_t) – (ModZ) x (\sigma_{i \text{ or } p}) \qquad (2)$$

where

$$ModZ = (z + \frac{Skew(z^2-1)}{3!} + \frac{Kurt(z^3-3z)}{4!} + \frac{Skew^2(2z^3-5z)}{36}) \qquad (2A)$$

where z is the normal z-score corresponding to the desired confidence level
Skew is the skewness of the population
Kurt is the excess kurtosis or absolute kurtosis - 3

Portfolio's variance:

$$\sigma_p^2 = \sum_i w_i^2 \sigma_i^2 + \sum_i \sum_{j \neq i} w_i w_j \sigma_i \sigma_j \rho_{ij}, \qquad (3)$$

Portfolio's variance is computed using the above equation
where

σ_p = *standard deviation of daily % changes in currency portfolio*
σ^2_p = *variance of daily % changes in currency portfolio*
w_i = *proportion of total portfolio value denominated in currency i*
w_j = *proportion of total portfolio value denominated in currency j*
σ_i = *standard deviation of weekly percentage changes in currency i*
σ_j = *standard deviation of weekly percentage changes in currency j*
ρ_{ij} = *correlation coefficient of weekly percentage changes between currencies i and j*

RESULTS

Currency Correlation (Emerging Markets)

The correlation coefficients between pairs of currencies can vary and hence are not stable and/or constant over time. The correlation coefficients for the eight selected emerging market currencies, based on daily percentage changes, are presented in Tables 2 & 3 during pre- and post-Covid-19 periods.

As it can be observed, for almost all of the currency pairs, the correlation coefficients have changed substantially between the pre- and post-Covid-19 periods. During the pre-Covid period MYR-BRL had the least correlation coefficient of 0.1727 among the eight currency pairs and TWD-KRW had the highest of 0.7123 correlation coefficient.

TABLE 2: CORRELATION COEFFICIENT BETWEEN EMERGING MARKETS CURRENCY PAIRS (PRE-COVID JULY 2018 – DECEMBER 2019)

	BRL	INR	KRW	MYR	MXN	ZAR	TWD	THB
BRL	1.0000	0.2050	0.2892	0.1727	0.3801	0.4779	0.2782	0.2403
INR		1.0000	0.4349	0.3210	0.2166	0.3574	0.3625	0.2148
KRW			1.0000	0.5252	0.3997	0.4820	0.7123	0.4257
MYR				1.0000	0.1946	0.2787	0.4386	0.2474
MXN					1.0000	0.5357	0.3318	0.2348
ZAR						1.0000	0.4569	0.4169
TWD							1.0000	0.4242
THB								1.0000

TABLE 3: CORRELATION COEFFICIENT BETWEEN EMERGING MARKETS CURRENCY PAIRS (POST-COVID JANUARY 2020 – JUNE 2021)

	BRL	INR	KRW	MYR	MXN	ZAR	TWD	THB
BRL	1.0000	0.3005	0.2859	0.2406	0.5442	0.5433	0.1959	0.2683
INR		1.0000	0.2724	0.3489	0.4711	0.4192	0.2233	0.4038
KRW			1.0000	0.5276	0.3847	0.3226	0.4968	0.4023
MYR				1.0000	0.4378	0.3102	0.3858	0.3672
MXN					1.0000	0.6786	0.2690	0.3760
ZAR						1.0000	0.2837	0.3929
TWD							1.0000	0.3652
THB								1.0000

During the post-Covid period TWD-BRL had the least correlation coefficient of 0.1959 among the eight currency pairs and ZAR-MXP had the highest of 0.6786 correlation coefficient. From tables 2 and 3, the correlation coefficients between currency pairs are all different which can be attributed to the volatility of each currency during those periods. Interestingly, TWD correlation coefficients with all other currencies decreased from the pre to post-Covid period reflecting the pandemic's negative impact on exports affect on the Taiwan dollar.

Modified Value-at-Risk, Max daily loss results and standard deviation for emerging markets

The MVaR predicts the maximum one-day loss for the particular currency. The maximum one-day loss is the actual maximum loss for the particular currency during the eighteen-month period. We compare the MVaR to the max daily loss for the selected emerging markets currencies. Table 4 summarizes the actual maximum daily loss and the average daily MVaR for the entire 18-month pre-Covid-19 time period. The MVaR for the Brazilian real (-2.44248%) indicates the deepest predicted maximum 1-day loss, while the MVaR for the Malaysian ringgit (-0.63354%) predicts the smallest maximum daily loss, among the eight selected currencies.

TABLE 4: EMERGING MARKETS CURRENCIES REALIZED RETURN AND MVaR (PRE-COVID JULY 2018 – DECEMBER 2019)

Currency	Max daily loss	MVaR @ 99%
BRL	-2.12616%	-2.44248%
INR	-2.18952%	-1.16621%
KRW	-1.55574%	-1.33628%
MYR	-0.71565%	-0.63354%
MXN	-2.86230%	-1.84166%
ZAR	-3.95296%	-2.16039%
TWD	-0.79039%	-1.17587%
THB	-1.32670%	-0.78294%

Comparing the maximum one-day loss for each currency relative to the predicted one-day loss using MVaR gives us a better understanding on the potential currency exposure risk. The maximum one-day loss seems higher than predicted by MVaR for all currencies with the exception of TWD and BRL.

Figure 5 offers a visual comparison of the maximum daily loss predicted by the MVaR model and the actual maximum one-day loss for the eight selected currencies during the pre-Covid period.

FIGURE 5: MAX ONE DAY LOSS vs MVaR FOR EMERGING CURRENCIES ONE- PERIOD LOSS/GAIN (PRE-COVID JULY 2018 – DECEMBER 2019)

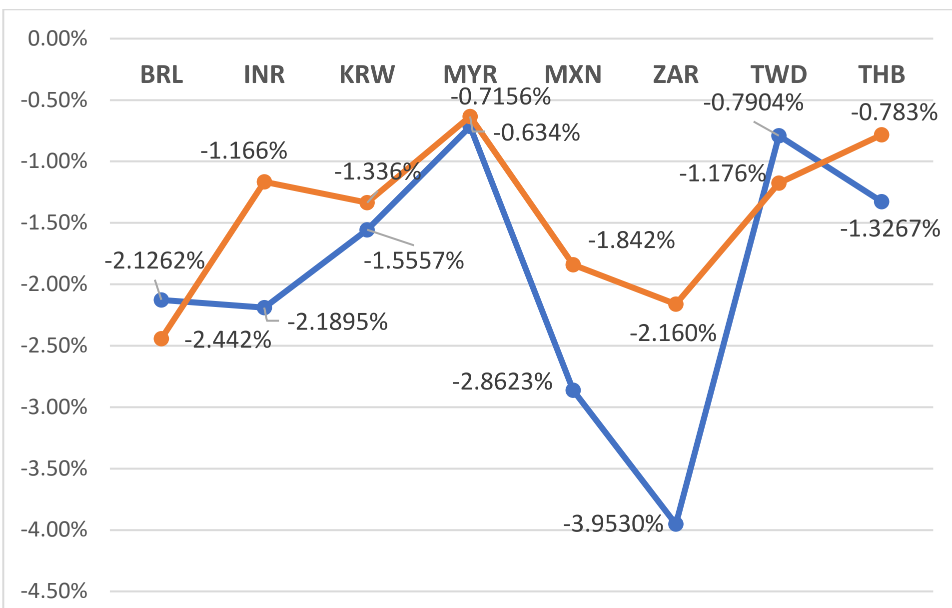


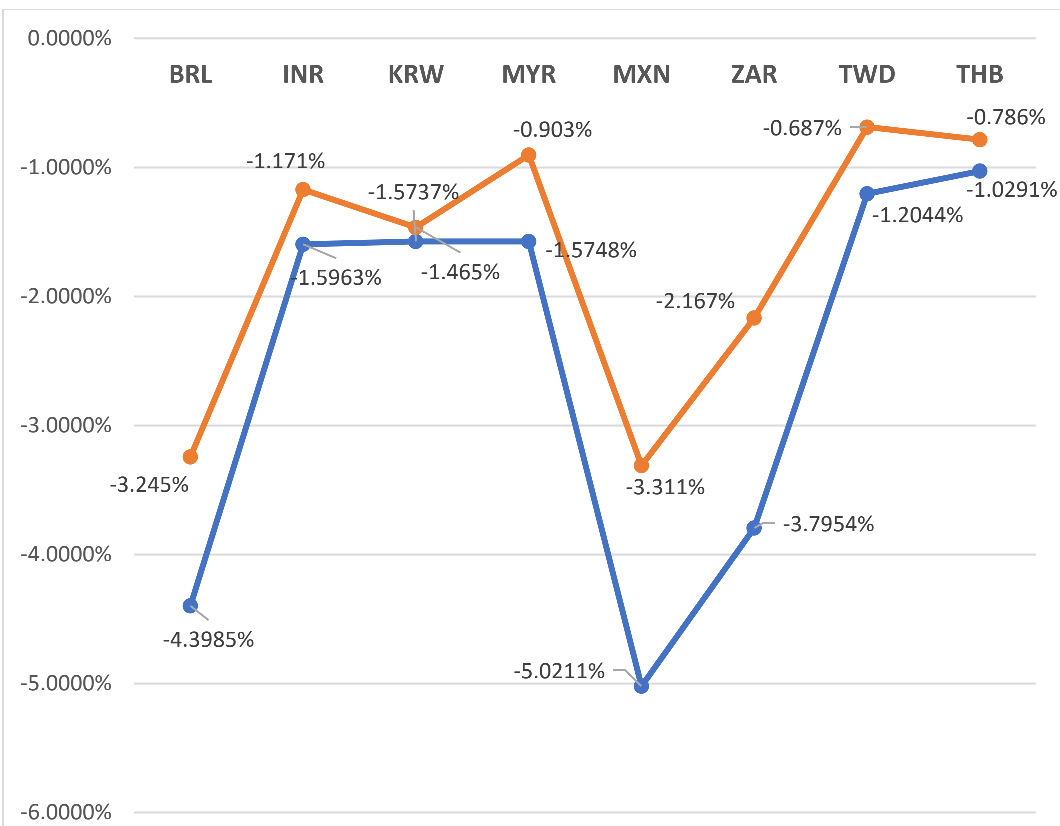
Table 5 summarizes the post-Covid-19 maximum one-day loss for each individual emerging market currency during the eighteen-month period and the predicted MVaR one-day loss. The Mexican peso shows the largest predicted maximum daily loss at -3.31% while the smallest maximum daily loss is predicted for the Taiwanese dollar at -0.69%. During the post-Covid-19 period, all the emerging market currencies had a greater one-day loss compared to the predicted MVaR one-day loss. This is indicative of the increased volatility and larger negative impact of the pandemic on these emerging market currencies.

TABLE 5: EMERGING MARKETS CURRENCIES REALIZED RETURN AND MVaR (POST-COVID JULY 2018 – DECEMBER 2019)

Currency	Max loss	MVaR @ 99%
BRL	-4.3985%	-3.24502%
INR	-1.5963%	-1.17150%
KRW	-1.5737%	-1.46487%
MYR	-1.5748%	-0.90324%
MXN	-5.0211%	-3.31130%
ZAR	-3.7954%	-2.16683%
TWD	-1.2044%	-0.68699%
THB	-1.0291%	-0.78569%

Figure 6 offers a visual comparison of the maximum daily loss predicted by the MVaR model and the actual maximum one-day loss for the eight selected currencies during the post-Covid period. It is striking to see the difference between the pre-Covid and post-Covid comparison of the maximum one-day loss and predicted one day loss using MVaR. In the pre-Covid period, the maximum one-day loss is higher than predicted by MVaR for all currencies with the exception of TWD and BRL. Whereas, in the post-Covid period for all emerging market currencies, the maximum one-day loss is consistently higher than the MVaR predicted one-day loss.

FIGURE 6: REALIZED VS. MVAR FOR EMERGING CURRENCIES ONE- PERIOD LOSS/GAIN (POST-COVID JANUARY 2020 – JUNE 2021)



Optimal Hedging Portfolios:

We use nonlinear optimization methods to construct the optimal portfolio. The order of each currency's entry in the portfolio numerically makes the MVaR as small as possible at every instance. The MVaR is a complex function of the standard deviation as well as the skewness and kurtosis (equ 2). So, the entry order is influenced by the standard deviation, but also the covariances and kurtosis (i.e., we might have two currencies with equal standard deviations but unequal kurtosis, leading one of the two to be favored).

In Table 6 we present equally weighted hedge portfolios for the eight selected emerging market currencies, based on both the standard deviations and MVaR of the currency portfolios. The currencies are added to the portfolio starting with the currency with the lowest standard deviation, and each additional currency is added from lowest to highest volatility. The order of currency inclusion based on the least to highest standard deviation are as follows, Malaysian ringgit, Taiwanese dollar, Thai baht, Indian rupee, Korean won, Mexican peso, Brazilian real and South African rand. The resulting portfolio standard deviations reflect the pairwise covariances of the currencies in each portfolio. As we construct the currency portfolios using rolling 12-month standard deviations and correlation coefficients, the computed MVaR values for the portfolios are different from individual currency MVaR values in Table 4. For example, in Table 4 the MYR MVaR value is -0.63354% (which is computed using 18 months of return data), whereas in Table 6 the MYR MVaR value is -0.58584% (based on 6-months of SD data from the rolling 12-month standard deviations over the 18-month period). They reflect, in a sense, *optimal* currency portfolios based on modern portfolio theory and, hence, should provide superior information to MNEs about the risks of operating across multiple currencies

TABLE 6: EMERGING MARKETS EQUALLY WEIGHTED CURRENCY PORTFOLIO (PRE-COVID JULY 2018 – DECEMBER 2019)

Portfolio SD	MVaR	Portfolio Composition
0.19651%	-0.58584%	MYR
0.18801%	-0.47066%	MYR, TWD
0.18894%	-0.52768%	MYR, TWD, THB
0.20434%	-0.59351%	MYR, TWD, THB, INR
0.23681%	-0.68335%	MYR, TWD, THB, INR, KRW
0.25249%	-0.73237%	MYR, TWD, THB, INR, KRW, MXN
0.28309%	-0.76770%	MYR, TWD, THB, INR, KRW, MXN, BRL
0.33437%	-0.82964%	MYR, TWD, THB, INR, KRW, MXN, BRL, ZAR

We find that the equally weighted two currency portfolio of Malaysian ringgit and Taiwanese dollar has the lowest standard deviation (0.18801%). In addition, this two currency MYR, TWD has the lowest MVaR value(-0.47066%) of all the currency portfolios during the pre-Covid period.

Figure 7 provides a graphical representation of the portfolio standard deviation and MVaR as the different currencies are added to the portfolio.

In Table 7, we identify the optimal currency portfolios in the post-Covid-19 period. When standard deviation and MVaR are considered together, we find that the equally weighted four currency portfolio of Taiwanese Dollar, Malaysian Ringgit, Thai Baht, and Indian Rupee has the lowest predicted MVaR one-day loss (0.57767%) in the post-Covid period, though we observe that the standard deviation of the optimal portfolio has increased substantially during the post-Covid-19 period. We can conclude that in addition to the increase in the volatility of the individual currencies, the volatility of diversified currency portfolios has also increased during the post-Covid period.

FIGURE 7: EQUALLY WEIGHTED EMERGING COUNTRIES CURRENCY PORTFOLIO (PRE-COVID JULY 2018 – DECEMBER 2019)

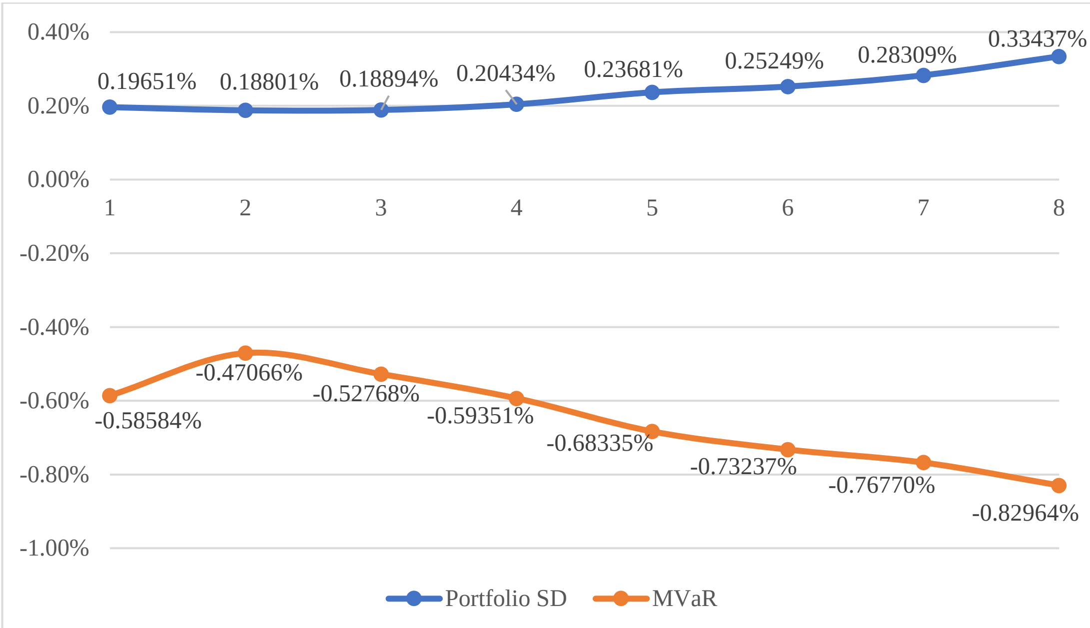
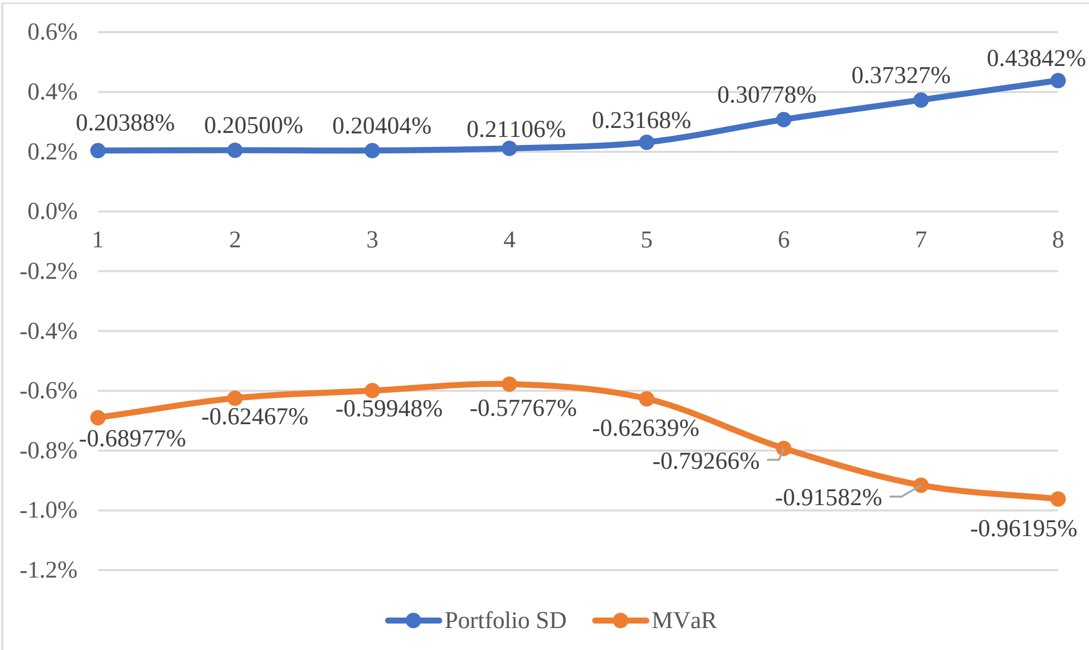


TABLE 7: EMERGING MARKETS EQUALLY WEIGHTED CURRENCY PORTFOLIO (POST-COVID JANUARY 2020 – JUNE 2021)

Portfolio SD	MVaR	Portfolio Composition
0.20388%	-0.68977%	TWD
0.20500%	-0.62467%	TWD, MYR
0.20404%	-0.59948%	TWD, MYR, THB
0.21106%	-0.57767%	TWD, MYR, THB, INR
0.23168%	-0.62639%	TWD, MYR, THB, INR, KRW
0.30778%	-0.79266%	TWD, MYR, THB, INR, KRW, ZAR
0.37327%	-0.91582%	TWD, MYR, THB, INR, KRW, ZAR, MXN
0.43842%	-0.96195%	TWD, MYR, THB, INR, KRW, ZAR, MXN, BRL

Figure 8 presents a visualization of the portfolio standard deviation and MVaR as additional currencies enter the portfolio. The addition of the currencies to the portfolio from one (TWD) to two (TWD, MYR) increases the resulting portfolio's standard deviation. Adding the third currency THB lowers the three-currency portfolio's standard deviation. This could be the optimal emerging market currency portfolio if MNEs wish to hedge their transaction exposure risk, since adding more currencies results in the portfolio risk to continue to increase. Given the increased volatility in the post-Covid period, MNEs operating in emerging markets have substantial transaction exposure risk. In order to mitigate any currency loss, above results suggest hedging in these three currencies (Malaysian ringgit, Taiwanese dollar and Thai baht) would offer the best risk mitigation.

FIGURE 8: EQUALLY WEIGHTED EMERGING COUNTRIES CURRENCY PORTFOLIO (POST-COVID JAN 2020 – JUNE 2021)



CONCLUSIONS

Our results indicate the currency values of the eight selected emerging countries has increased slightly on the average during the post-Covid-19 period. Six of the eight currencies (BRL, INR, KRW, MYR, MXN, TWD) had a wider trading range, and six of the eight currencies (BRL, KRW, MYR, MXN, ZAR, THB) had larger standard deviations during the post-Covid-19 period. The consequences of Covid-19 resulted in a surge in maximum expected one-period loss (MVaR) for seven of the eight currencies with TWD being the only exception. The actual maximum daily loss was higher for five of the eight currencies (BRL, KRW, MYR, MXN, TWD), confirming increased currency exposure risk for MNEs operating in emerging markets in the post-Covid-19 period. These results will convey important information to MNEs operating in those eight emerging markets during pre- and post-Covid-19 periods. Hedging is expensive and maintaining a hedge is costly. It can be concluded that those MNEs with mainly net overall foreign currency inflows would have benefited from hedging by reducing the volatility of their currency exchange returns. However, given the net increase in the average currency values in the post-Covid-19 period, unhedged positions may have performed better. Further research into identifying optimal weighted hedging portfolios based on the emerging market currencies, to supplement our equally weighted portfolio results would be beneficial, providing further insight into the decision on which currency risk exposures should be hedged for best results.

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ETHICAL DECISION MAKING AND EMOTIONAL IMPACT ON THE PERCEPTION OF BUSINESS

Emotions significantly influence how people conduct themselves in their daily lives and interactions with others, especially in ethical decision judgements across a variety of situations (Connelly et al 2004; Steenhaut and Van Kenhove 2006; Cohen et al 2013). Several scholars have called for the inclusion and examination of the emotional component in marketing ethics research (Lurie 2004; Connelly et al. 2004; Tenbrunsel and Smith-Crowe 2008; Kim et al. 2009; Vitell et al. 2013). Tenbrunsel and Smith-Crowe (2008) even begin to question the belief that ethical decision making in ethical situations is based in reason. Other research has also stated that decision making can be influenced by an individual's emotional state and that emotions may impact intentions, resulting in behavioral intentions to differ from individual ethical judgements (Gaudine and Thorne, 2001). Kligyte (2008) stated that if an individual is in a state of unregulated anger, this can directly and negatively impact intentions and resulting behavior, therefore causing a person to act in a manner that is different from true ethical beliefs. Consumer behavior literature has focused on emotions as a key element in the decision-making process, with various studies focusing on consumer decision making regarding consumer ethics (Vitell et al., 2013). Ethical decision making by consumers is an essential component of consumer behavior, and can be impacted by emotions, therefore the study of exactly how emotions can influence consumer behavior is worthy of further examination.

Despite the attention that has been given to understanding ethical decision making, there are other influencing factors that have received much less attention. Emotions and emotion-related factors, such as emotional commitment are a couple of the factors that require further examination. Hardy (2006) stated that emotions may be the main motivating factor that leads to a moral action. In accordance with the cognitive theory of emotion, individual's decision-making and subsequent actions are determined by interaction with the environment. This interaction is vital to understanding how emotions originate as a result of experiences in various situations and how these emotions influence decision making (Vitell et al., 2013). In everyday life individuals encounter a multitude of situations that are capable of inducing stress and eliciting an emotional response.

The affective state of emotion is described as either positive or negative affect (Fillenbaum and Rapoport, 1970). Negative affect encompasses emotions such as anger and fear, while positive affect includes emotions such as happiness and joy. Gaudine and Thorne (2001) suggest that positive emotions will increase the likelihood that individuals will recognize ethical dilemmas, possess ethical intentions congruent with moral development, and act consistent with intentions if emotional arousal is present. Previous research suggests that positive affect also increases access to congruent memories, Bower (1981) observed that positive emotions allow access to a greater amount of information with positive emotional associations. Thus positive affect provides the ability to more correctly identify ethical dilemmas due to the increased amount of information available for retrieval. The Gaudine and Thorne model also acknowledges the impact of negative emotions in that negative emotions are likely to have different effects in an ethical decision-making process (Connelly et al, 2004). Different negative emotions can focus an individual's attention outward when in an angered state, where as depression can focus attention inward.

Two sources of emotions have been identified and studied in consumer behavior literature: task-related and incidental (Vitell et al., 2013). Task-related emotions are inherently associated with the situation currently being faced or performed. Incidental emotions are unrelated to the current situation and originate from incidents or cognitions that are irrelevant to the current task. Incidental emotions tend to remain and influence the way in which individuals deal with subsequent stressful situations and decision making (Vitell et al., 2013). The influence of incidental emotions and task-related emotions has been deeply studied in consumer behavior literature (Garg et al., 2005), the influence of incidental and task-related emotions in ethical decision making has been limited thus far (Vitell et al., 2013).

A primary concern of the research is the effective manipulation of emotions and the measures of emotions. The type of manipulations employed is consistent with those utilized in previous emotion research (Garg et al 2007; Singh et al. 2016). The emotions of angry, mad, furious, irritated, and enraged are utilized to induce the negative emotion score of anger. To induce the positive emotion of happiness, the emotions of joy, delight, pleasure, and happy are utilized. To induce the desired emotional condition, participants will be asked to recall several life events during which they experienced a great deal of happiness or anger, with the control group describing a typical daily routine. After recalling these events participants in an emotional manipulation state will then be asked to describe the details of feelings or emotions [positive or negative) felt during the most intensely recalled situation. Following this emotional recall, the participants in the positive emotion group will read a scenario which will describe the details of an encounter with an individual followed by a corresponding dining experience. At the conclusion of the dining experience the participant will be presented with the ethical dilemma of receiving too much change when paying the bill. The scenario of receiving too much change when paying the bill is contained in the Consumer Ethics Scale of Muncy and Vitell (1992), and is adopted from this previous research. This situation is utilized because the unethical reaction of not correcting the mistake and keeping the excess change is found to be relatable, common, and widespread among consumers as a whole. The scenarios presented to the participants provide an acceptable and familiar means of conducting consumer ethics research when the observation of real-life behaviors is impractical.

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Ethical Intention: The Effects of Anonymity

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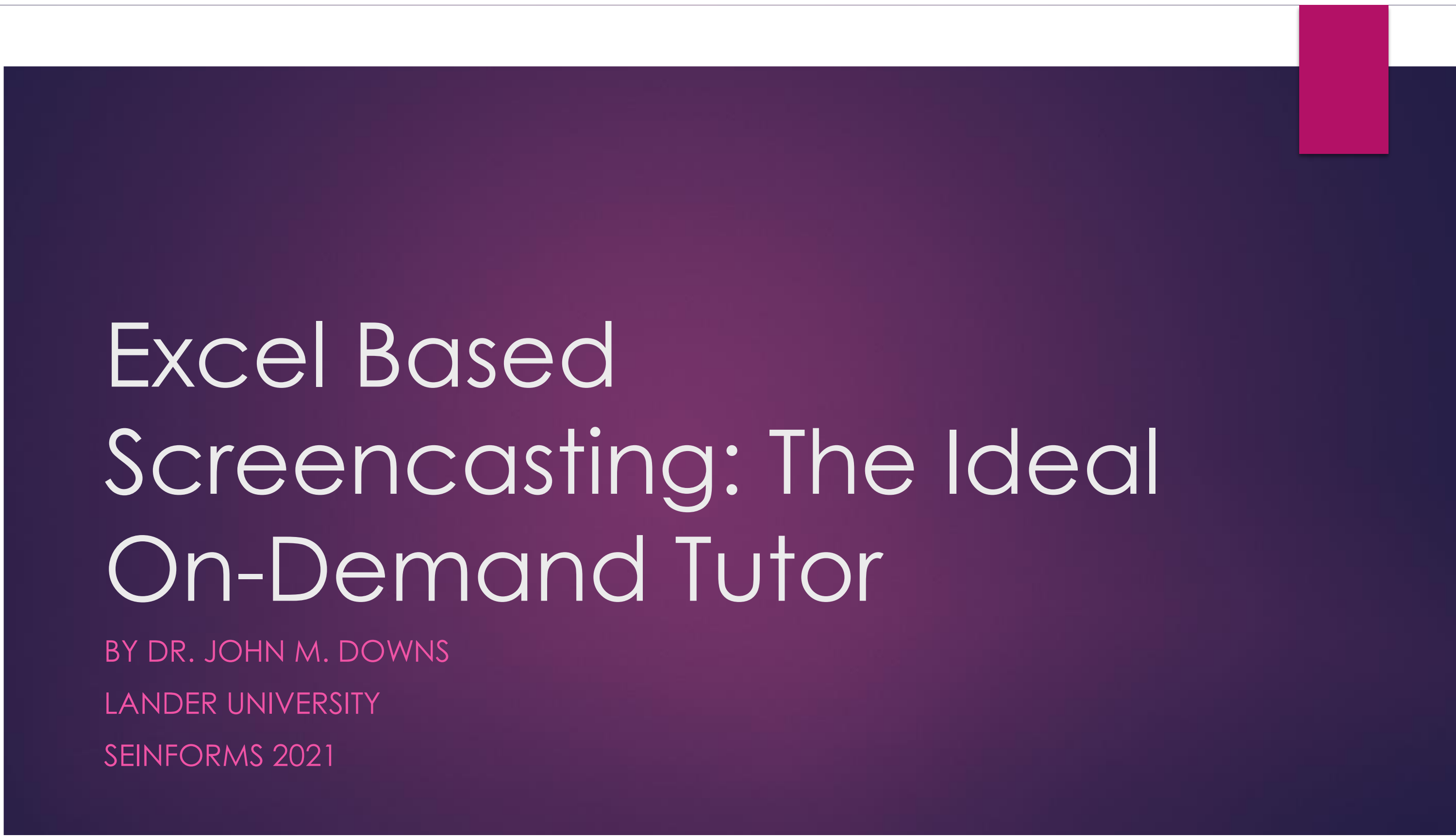
Ethics is a very complex subject and a part of philosophy that deals with what is morally right and wrong (Woermann and Cilliers, 2012), and has been defined as "…inquiry into the nature and grounds of morality where the term morality is taken to mean judgments, standards, and rules of conducts" (Akaah and Lund, 1994). The history of ethics dates back as far as mankind, yet, ethics and ethical behavior are topics that will forever warrant further investigation. Specifically, this study investigates the effect of anonymity on an individual's ethical behavior. This study does not necessarily care about an individual's ethical barometer, or how ethical an individual believes any given act be. Rather, this study focuses on how important anonymity is on an individual's willingness to pursue what they believe is unethical.

To better understand the relationship of anonymity and ethical intention, this study utilizes the theory of planned behavior (TPB) and deindividuation theory. The TPB addresses an individual's attitude toward an action, the subjective norms associated with the action, and the perceived behavioral control as the precursors of behavioral intention, and posits behavioral intention as the predecessor of actual behavior (Ajzen, 1991). This study builds on the TPB by introducing anonymity as both a predictor of ethical behavior and as a moderator on both the attitude-intention relationship as well as the subjective norms-intention relationship. Deindividuation theory is utilized to account for the effects of anonymity on ethical behavior. Deindividuation theory proposes a subjective deindividuated state that accounts for anonymity and causes transgression of general social norms (Postmes and Spears 1998).

Voluntary responses to a survey including a series of scenarios is used for data collection. A method called policy capturing assisted by regressions and Tukey's HSD is utilized for data analysis. This method allows each of the independent variables (attitudes, subjective norms, perceived behavioral control, and anonymity) to be manipulated in order to determine their level of importance in regards to an individual's ethical intention. The most interesting findings are found when anonymity runs counter to attitude and/or subjective norms.

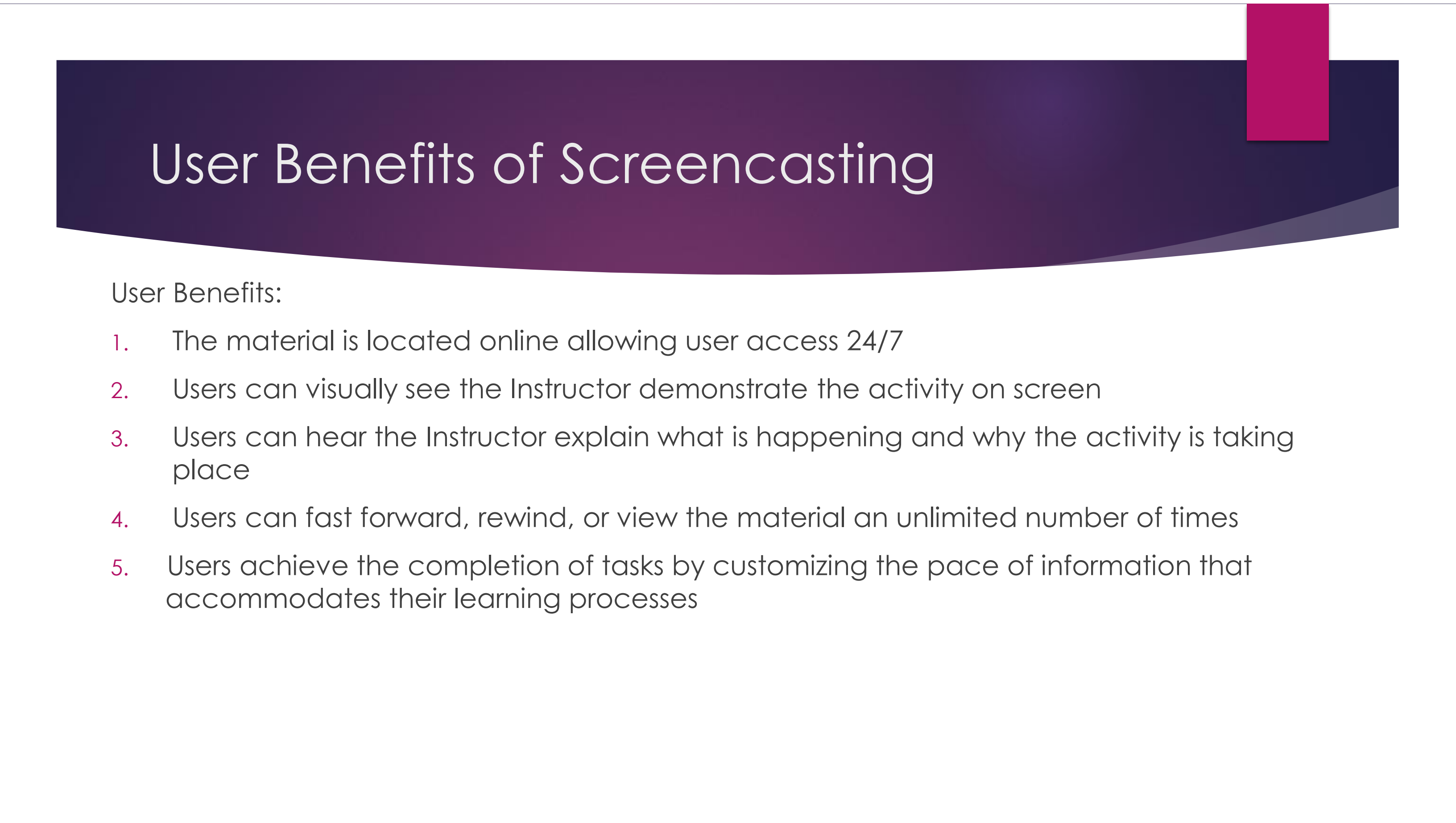

Excel Based Screencasting: The Ideal On-Demand Tutor
BY DR. JOHN M. DOWNS
LANDER UNIVERSITY
SEINFORMS 2021

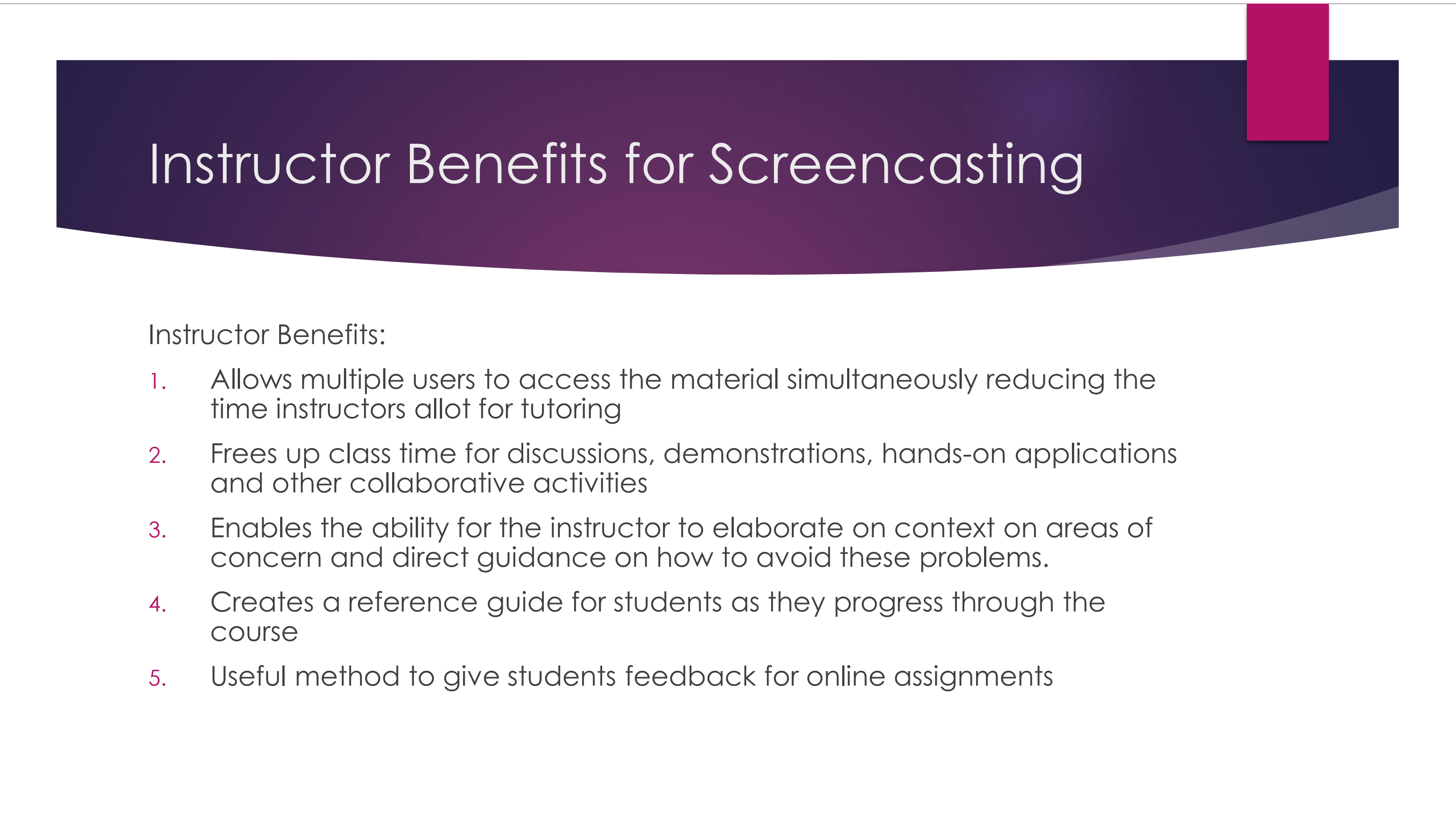
What is Screencasting?

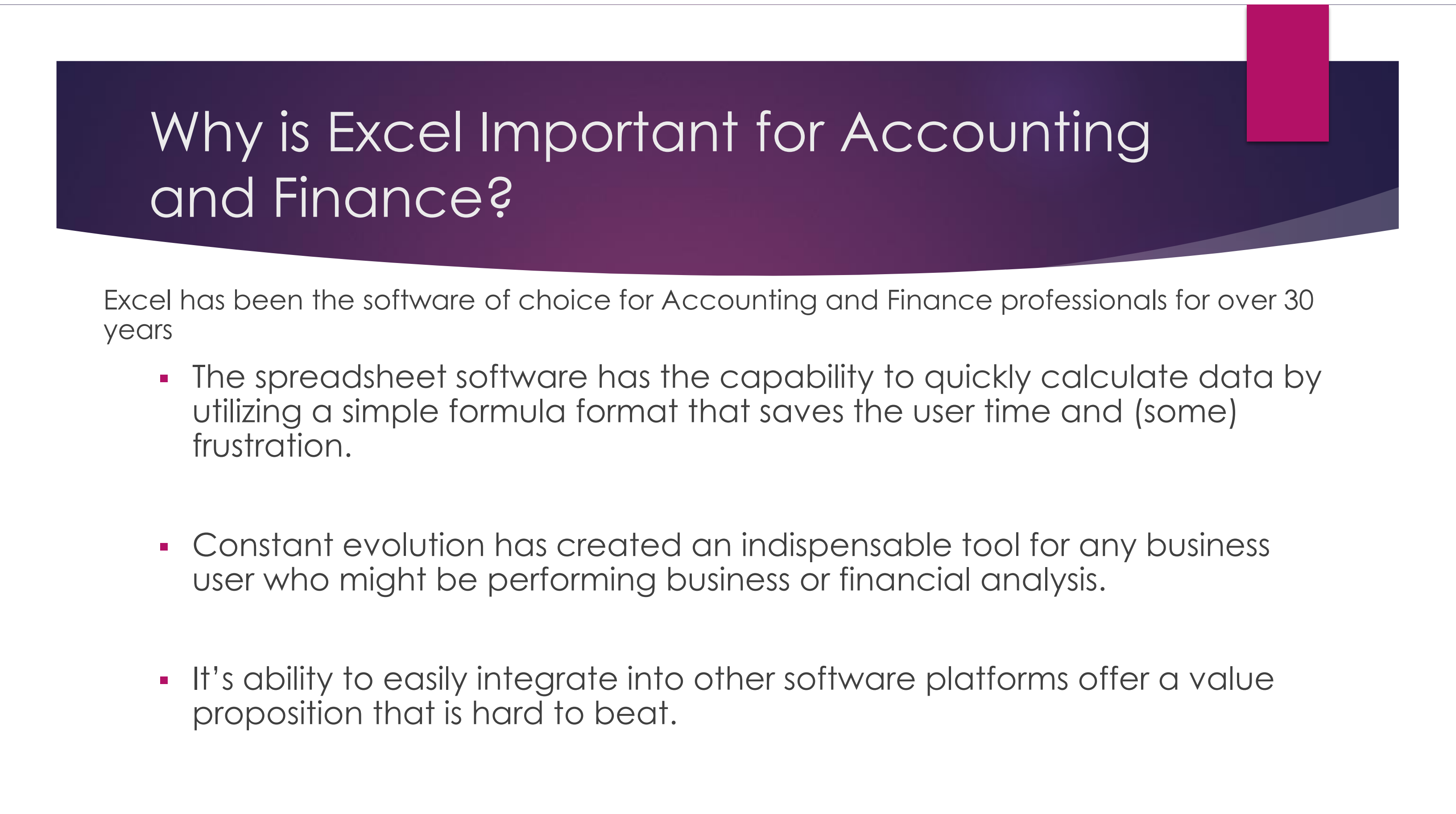
Screencast Defined- the capture of actions of a user's computer screen over a period of time.

-Involves audio and sometimes includes animations, graphics, or video within video.

-Streamed over a network but can be in other formats.


User Benefits of Screencasting
User Benefits:
1. The material is located online allowing user access 24/7
2. Users can visually see the Instructor demonstrate the activity on screen
3. Users can hear the Instructor explain what is happening and why the activity is taking place
4. Users can fast forward, rewind, or view the material an unlimited number of times
5. Users achieve the completion of tasks by customizing the pace of information that accommodates their learning processes


Instructor Benefits for Screencasting
Instructor Benefits:
1. Allows multiple users to access the material simultaneously reducing the time instructors allot for tutoring
2. Frees up class time for discussions, demonstrations, hands-on applications and other collaborative activities
3. Enables the ability for the instructor to elaborate on context on areas of concern and direct guidance on how to avoid these problems.
4. Creates a reference guide for students as they progress through the course
5. Useful method to give students feedback for online assignments


Why is Excel Important for Accounting and Finance?
Excel has been the software of choice for Accounting and Finance professionals for over 30 years
The spreadsheet software has the capability to quickly calculate data by utilizing a simple formula format that saves the user time and (some) frustration.
Constant evolution has created an indispensable tool for any business user who might be performing business or financial analysis.
It’s ability to easily integrate into other software platforms offer a value proposition that is hard to beat.

Applications for Excel Based Screencasting in the Digital Learning Environment

Synchronous Learning

Live demonstrations of Excel Problems i.e., Blackboard Collaborate

Utilize cloud-based services to file share with other users

Sync different workbooks and spreadsheets to ensure that changes in one will be reflected in each other

Asynchronous Learning

*Recording of material allows the lesson to become an on-demand tutor available 24/7

-More powerful because Excel is a technical skill that requires sequencing of formulas and data

-Most learners need repetition to master technical skills

-Internet accessibility allows multiple users to access screencast and receive private lesson simultaneously

Ideal Excel Tasks to Screencast

Formulas

Basic Formatting

Simple and Nested IF Statements

Combining HLOOKUP, VLOOKUP, CHOOSE, and MATCH

Data Tables

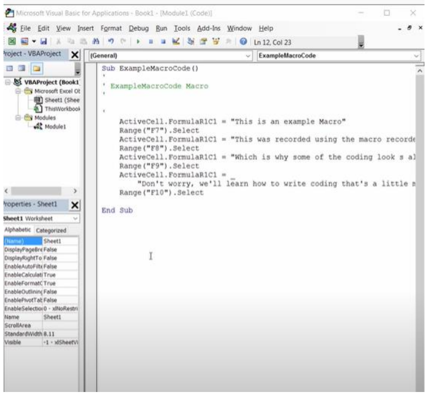
Mathematical Functions

Text Functions

Pivot Tables

Solver

VBA- Macros



Screencasting Microsoft 365

Insert Screencasts into Microsoft PowerPoint

Step 1: Insert Tab hit Screen Recording

Step 2: Drag the box around the area you want to record

Step 3: Press the record button

Step 4: Press the stop button after completion and the screencast will be inserted into your PowerPoint.

Step 5: Click Video Tools Playback Tab and Trim video to desired length.

Example

x Financial Statement for Visa	
$ mm except per share	
Company Name	Visa
Ticker	V
Share price as of last close	$137.69
Latest share price closing date	1/17/2019
Latest fiscal year end date	9/30/2018
Circuit Breaker	

x **Income Statement**	2014A	2015A	2016A	2017A	2018A	2019P	2019A	2020P	2021P	2022P	2023
In Millions, unless otherwise specified	Sep. 30,	Sep. 30,	Sep. 30,	Sep. 30,	Sep. 30,	Sep. 30,	Sep. 30,	Sep. 30,	Sep. 30,	Sep. 30,	Sep. 30,
Operating Revenues											
Service Revenues	5,797	6,302	6,747	7,975	8,918	9,553		10,218	10,929	11,689	12,50
Data Processing Revenues	5,167	5,552	6,272	7,786	9,027	10,387		11,955	13,760	15,838	18,22
International Transaction Revenues	3,560	4,064	4,649	6,321	7,211	8,635		10,337	12,376	14,816	17,73
Other Revenues	770	823	823	841	944	994		1,046	1,101	1,159	1,22
Client Incentives	(2,592)	(2,861)	(3,409)	(4,565)	(5,491)	(6,643)		(8,038)	(9,726)	(11,769)	(14,24
Net Operating Revenues	**12,702**	**13,880**	**15,082**	**18,358**	**20,609**	**22,924**	**22,977**	**25,517**	**28,439**	**31,734**	**35,45**
Operating Expenses											
Personnel	1,875	2,079	2,226	2,628	3,170	3824		4,613	5,564	6,711	8,09
Marketing	900	872	869	922	988	1059		1,277	1,541	1,858	2,24
Network and Processing	507	474	538	620	686	759		916	1,104	1,332	1,60
Professional fees	328	336	389	409	446	486		586	707	853	1,02
Depreciations and amortization	435	494	502	556	613	676		815	984	1,186	1,43
General and administrative	507	547	796	1,060	1,145	1237		1,492	1,800	2,171	2,61
Litagation purposes	453	14	2	19	607	607		607	607	607	60
Visa Europe Framework Agreement	0	0	1,877	0	0	0		0	0	0	
Total Operating Expenses	5,005	4,816	7,199	6,214	7,655	8,648		10,306	12,306	14,718	17,62
Operating Income (EBIT)	**7,697**	**9,064**	**7,883**	**12,144**	**12,954**	**14,276**	**15,001**	**15,211**	**16,133**	**17,015**	**17,82**

Screencasting Internal Applications

PC Windows

1. Camera
2. Xbox Gaming Tool
3. Snipping Tool

Apple

1. Camera
2. QuickTime
3. iMovie
4. Final Cut Pro X

Smartphone/Tablet

1. Camera Option
2. Assorted Applications

External Applications for Screencasting

- YouTube
- Screencast O-Matic
- Echo 360
- Microsoft Teams
- Adobe Captivate
- Open Broadcaster Software
- Screencastify
- Vmaker
- Apowersoft
- Icecream Screen Recorder
- iSpring Cam Pro
- Camtasia Pro

Best Practices for Content Creation

- ✓ Present the screencast from a tutorial perspective rather than a lecture-based perspective
- ✓ Anticipate the user's attention to last a maximum of 2-3 minutes before they start skipping
- ✓ Creation of timestamps or points to skip throughout the video
- ✓ Store your content on an individual cloud-based service
- ✓ Supported Video File Formats: .mp4, .webm
- ✓ Supported Image File Formats: .jpg, .png, .bmp, .gif

Research Based Best Practices for Screencasting

- Instructors should focus on producing a high-quality video

  -Content Preparation

  -Recording

  -Production

  -Publishing

- Users prefer screencasts that include:

  -Short duration

  -Generally, error free

  -Compatible with multiple devices

  -Instructors with high energy and enthusiasm

Research of Screencasting Effectiveness for Learning Outcomes

- Screencast tutorials are more effective than other tutorial formats
- Majority of users gain a deeper understanding of the material through higher performance on tests and quizzes
- Help Instructors compete for user attention

Proposed Research Design

- Identify Accounting and Finance based courses that will have two sections of same class during semester (Control, Experiment)
- Identify a common method of measurement for learning outcomes for the subject
- Offer only individual tutorials for the Control group
- Offer only Screencasting tutorials for the Experiment group

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EXPERT SYSTEMS WITH APPLICATIONS

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Expert Systems with Applications is a refereed international journal whose focus is on exchanging information relating to expert and intelligent systems applied in industry, government, and universities worldwide. The thrust of the journal is to publish papers dealing with the design, development, testing, implementation, and/or management of expert and intelligent systems, and also to provide practical guidelines in the development and management of these systems. The journal will publish papers in expert and intelligent systems technology and application in the areas of, but not limited to: finance, accounting, engineering, marketing, auditing, law, procurement and contracting, project management, risk assessment, information management, information retrieval, crisis management, stock trading, strategic management, network management, telecommunications, space education, intelligent front ends, intelligent database management systems, medicine, chemistry, human resources management, human capital, business, production management, archaeology, economics, energy, and defense. Papers in multi-agent systems, knowledge management, neural networks, knowledge discovery, data and text mining, multimedia mining, and genetic algorithms will also be published in the journal.

Faculty Self-Efficacy and the Pandemic: Lessons Learned for Course Development

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Abstract

The spread of the coronavirus (Covid-19), brought about many changes to many robust university networking systems that allow students from numerous geographical areas to engage in close proximity of one another. The change in dynamic resulting in a period of expansive growth in online learning in the U.S. higher education, had a direct impact on the self-efficacy of instructors. Teaching self-efficacy is important because it is the basis for a professor's propensity to work through challenges brought about in the teaching environment, for example, transitioning to online teaching. According to Horvitz et al. (2014) future research is necessary to understand the way institutions train and support professors to teach online, focusing attention on building self-efficacy and applying this knowledge to current practices. The research questions to be answered are (1) What affect did the COVID-19 pandemic have on faculty self-efficacy? And (2) RQ2: Is there a positive correlation between faculty self-efficacy and [graduate] course quality? Data are gathered via a survey instrument of specific questions that will provide statistical information to prove or disprove each hypothesis. The results of this research will provide new knowledge of course design quality and its effect on faculty self-efficacy. This new knowledge can be applied to the development of online MBA course design in the post-pandemic period to ensure that MBA courses programs offer leadership effectiveness competences for students and increased self-efficacy for faculty.

Chapter 1 Overview

College and university campuses provide a robust network allowing students from numerous geographical areas to engage in close proximity of one another. The spread of the coronavirus (Covid-19), brought about many implications that would affect this intricate system. During a time when campus classes were cancelled and students and faculty were sent home, online teaching became the prominent tool for student retention and course continuance. While this transition may have been a much smoother process for larger institutions with the proper resources in place, smaller institutions, lacking the necessary resources for a smooth transition, and underprepared faculty, struggled with the transition (Robinia & Anderson, 2010). Chapter One provides the framework for this quantitative study. The background is presented. The problem, purpose, and significance for this study are clearly defined. In addition, the research questions and hypotheses are identified.

Background

Student Perspective – Learning Competency

Graduate management education, such as MBA programs, seeks to develop in students specific competencies that will result in effective leadership. An understanding of what makes these programs sustainable has shown that trends can be linked to social phenomena in the educational context and in the larger environment (Boyatzis et al. 2013). In the educational context, turbulence in key university leadership positions has been characterized by lower competency development results. During periods of stability throughout university administration, competency development was higher. In the larger environment, the impact of the 2008 financial crisis impacted competency development levels of MBA students.

MBA programs are not immune to changes in the organizational climate of a school or the larger economics in which they exist. According to Boyatzis et al. (2013), future research should examine social phenomena in the educational context and in the larger environment to determine their impact and seek to replicate or refute these interpretations.

Faculty Perspective – Self-Efficacy

The change in dynamic during a period of expansive growth in online learning in the U.S. higher education, had a direct impact on the self-efficacy of instructors. Self-efficacy levels have been related to barriers such as reliability of technology, technology competence of student and instructor, interpersonal nature of online courses, heavier workload characteristic of online teaching, course quality, lack of face-to-face interaction, instructor lack of experience in online teaching and the ability to be successful; in other words, their teaching self-efficacy.

Horvitz et al. (2014) suggested that perception of student learning and satisfaction with online teaching, most highly impact teachers' online teaching self-efficacy. According to Horvitz et al. (2014) future research is necessary to understand the way institutions train and support professors to teach online, focusing attention on building self-efficacy and applying this knowledge to current practices.

Statement of the Problem

MBA programs are not immune to changes in the organizational climate of a school or the larger economics wherein they exist. Teaching self-efficacy is important because it is the basis for a professor's propensity to work through challenges brought about in the teaching environment, for example, transitioning to online teaching. The level of faculty self-efficacy and its subsequent effect on student achievement, speaks volumes as to the effectiveness of the educational program. According to Phan and Hoover (2014) many online MBA programs are put together arbitrarily, without consideration for current instructional theories and principles.

As new MBA programs are launched in the post Covid-19 era, it is imperative to determine if institutions are providing support to graduate faculty that increases faculty efficacy. This support is provided through training, technology, and instructional course design resources. MBAs are in demand which supports the need to base course design on sound design principles. A quality course design framework allows for a better-quality designed course.

Research Questions

The pursuit of determining best practices of launching an MBA program demands an understanding of the effect of the Covid-19 pandemic on faculty self-efficacy. The first research question is:

RQ1: What affect did the COVID-19 pandemic have on faculty self-efficacy?

The level of faculty self-efficacy and its subsequent effect on student achievement, speaks volumes of the effectiveness of the educational system (Cerit, 2010; Tschannen-Moran & Woolfolk Hoy, 2001; 2007). Therefore, the second research question is:

RQ2: Is there a positive correlation between faculty self-efficacy and [graduate] course quality?

Hypotheses

To answer the first research question regarding the effect of Covid-19 on faculty self-efficacy, the following hypothesis is proposed:

H1: Faculty self-efficacy is lower in the post-Covid-19 pandemic period than in the pre-Covid-19 pandemic period.

To answer the second research question regarding the relation of faculty self-efficacy and graduate course quality, the following two hypotheses are posited:

H2: [Graduate] course quality and faculty self-efficacy are positively correlated.
H3: [Graduate] course quality and faculty self-efficacy are negatively correlated.

Assumptions and Limitations

Only faculty will be surveyed in the study. Therefore, any conclusions drawn on student learning competency is limited to faculty judgement. Other limitations for consideration are limited population for study related to location and size of sample. Asking faculty to self-report may be a limitation as faculty could rank themselves too high or too low on the survey instrument. This could happen purposefully or due to lack of understanding.

Definitions

Self-efficacy is concerned with how well a person believes he or she will be able to reach a desired outcome in a designated area (Bandura, 1977).

Summary

This research study seeks an understanding of the effect of the Covid-19 pandemic on faculty self-efficacy and if there is a correlation between faculty self-efficacy and course quality. The results of this research will provide new knowledge of course design quality and its effect on faculty self-efficacy. This new knowledge can be applied to the development of online MBA course design in the post-pandemic period to ensure that MBA courses programs offer leadership effectiveness competences for students and increased self-efficacy for faculty.

CHAPTER 2

REVIEW OF RELATED LITERATURE

There are many lessons to be learned from the COVID-19 Pandemic as it relates to academia. The pandemic brought about changes in student learning, changes in course delivery, and changes in instructional design. For a university launching an online program, it is necessary to be familiar with how the changes have affected academia, in order to ensure an effective and sustainable online program.

The online educational environment has long been characterized by isolation. The COVID-19 pandemic has exasperated the sense of separation and solitude for faculty and students alike. The results of an increased sense of isolation has been linked to long-term physical and emotional effects. It is necessary to ascertain the need for reformed strategies for creating genuinely engaging learning experiences for students in online programs. Fostering social presence, teaching presence, and cognitive presence are necessary components to encourage effective online learning. If online education is to remain competitive, faculty members must continue to receive the ongoing support they need to develop and administer meaningful online learning experiences for students with different learning styles and knowledge levels. As online MBA programs continue to evolve, it is necessary to understand how the pandemic has affected graduate level student learning and also graduate study course design and delivery. This understanding begins with an overview of instructor self-efficacy through the lens of institutional support and the impact of the outside environment, before and after the pandemic.

Relating Faculty Self-Efficacy to Student Learning Competencies in Online Courses

The past decade has shown a shift towards the desire for MBA programs that are delivered online and for shorter durations. When launching an MBA program understanding the target market has always been a necessity in creating a sustainable program. The development of courses, methods and materials must be based on sound, relevant instructional design principles.

Johnson et al. (2012) revealed that faculty teaching online courses, have concern over their ability to effectively teach and manage course outcomes. Research has repetitively shown that teacher efficacy has positive influences on student learning outcomes, student achievement, and student motivation. The level of faculty self-efficacy and its subsequent effect on student achievement, speaks volumes as to the effectiveness of the educational system (Cerit, 2010; Tschannen-Moran & Woolfolk Hoy, 2001; 2007).

Another dynamic that has changed in MBA programs is the type of instructor delivering courses. Faculty holding a degree in education have acquired teaching management skills to guide them through changes and maintain increased faculty efficacy. More frequently, however, MBA courses are taught by business practitioners. Practitioners typically have formal business expertise and years of business acumen, but they do not have the educational training related to classroom management skills that would help maintain increased self-efficacy during tumultuous interruptions.

Barriers to Self-Efficacy in Online Instruction

Barriers to instructor self-efficacy include reliability of technology, technology competence of student and instructor, interpersonal nature of online courses, heavier workload characteristic of online teaching, course quality, lack of face-to-face interaction, instructor lack of experience in online teaching and the ability to be successful (Horvitz et al., 2014). Horvitz et al. (2014) examined the challenges professors faced in the transition from seated classrooms to teaching online following a period of expansive growth in online learning in the U.S. higher education. This change in dynamic had a direct impact on instructors.

Teaching self-efficacy is important because it is the basis for a professor's propensity to work through challenges brought about in the teaching environment, for example, transitioning to online teaching. Self-efficacy is concerned with how well a person believes he or she will be
able to reach a desired outcome in a designated area (Bandura, 1977).

Horvitz et al. (2014), sought to foster a better understanding of the factors relating to online teaching self-efficacy using five attitude variables (1) pressure felt to teach online, (2) satisfaction, (3) perception of student learning, (4) future interest in teaching online, and (5) computer skills. The findings in this study suggest that perception of student learning and satisfaction with online teaching, as well as future interest in teaching online, most highly impact teachers' online teaching self-efficacy. Instructors become more confident in their ability to manage an online class given more experience. These variables can be addressed through faculty development in training and university support systems. The challenge to the university is to provide support to instructors early in their online teaching experience.

Institutional Support

Institutions must work to provide faculty with the support they need in the form of instructional design resources and technical assistance in order for them to design and teach quality online courses. Foroughi et al. (2018) examined challenges encountered by faculty offering an MBA program during a period when enrollment grew from 100 students to 620 students within a 24-month period. Individual class sizes increased from 65 to 245 students. Because the MBA market was quite competitive during that time, the faculty had to implement real-time changes to teaching methods, assignments, how they interacted with students, and other tasks. In this study three MBA courses were validated against ten course quality principles. The first five principles were developed by Merrill (2002). These principles focused on how learners learn.

Learners acquire skill in the context of finding solutions for real-world problems that are representative of real-world issues (Problem-Centered). Learning is promoted when learners activate existing knowledge and skill, apply them to new knowledge; and develop new mental models (Activation). Learning is promoted when learners observe a demonstration of the skill to be learned and are shown how to apply new information or skill in new situations (Demonstration). Learning is promoted when learners apply their newly acquired skill to solve problems, with scaffolding that is gradually diminished (Application). Learning is promoted when learners reflect on, discuss, and defend their newly acquired skill (Integration).

The next step was to verify that these principles were being applied in courses to effect learning during this period. Foroughi et al. (2018) used an additional 5 principles (Margaryan & Collins, 2005) to determine effective course design.

Learning is promoted when learners contribute to the collective knowledge (Knowledge Collective). Learning is promoted when learners collaborate with others (Collaboration). Learning is promoted when different learners are provided with different avenues of learning, according to their need (Differentiation). Learning is promoted when learning resources are drawn from real-world settings (Authentic Resources). Learning is promoted when learners are given expert feedback on their performance (Feedback).

The ten principles were applied to three MBA courses in order to ensure effectiveness in course design and course delivery. It is important to note that Merrill's (2002) study did not focus on online courses, but rather, was motivated by the acumen that proper instructional theories and principles were not being applied to the development and delivery of MBA courses, having a direct impact on the quality of the courses. Margaryan et al. (2015), however, used the ten principles to validate greater than one hundred online courses.

The application of the ten principles were aligned with specific assessments in three MBA courses in order to show the association of course quality to student learning. It was determined that certain guiding principles, to be included in course design, are important to the design of an online MBA program on many levels, including the fact that their presence in the course, elevates instructor self-efficacy. As MBA programs continue to evolve, universities are using practitioners more often to teach MBA courses, as opposed to actual professors of academia. Practitioners are not as experienced in course development and therefore the responsibility of course design and course quality falls upon the intuition. Practitioners and professors, alike, require support from the institution to ensure course design quality, which results in higher self-efficacy.

Environmental Barriers

It's not only the inside support from institutions that increase faculty self-efficacy, there are environmental elements at bay as well. MBA programs can positively impact students who need effective leadership skills in their related industry fields. Boyatzis et al. (2013) examined 16 cohorts in a full time MBA program over a twenty-five year period from 1987 to 2012. The study identified trends that affected competency development that would impact leadership effectiveness: (1) changes in organizational climate in the school and world events; (2) the saw-tooth or alternating cohort effect;(3) self versus other assessment differences; and (4) program components. Scores related to self-perceived learning skills showed that graduating scores were higher than entering scores supporting the notion that these skills are developed during the program.

The results related to trends linked to social phenomena in the educational context and larger environment, specifically the larger environment were significant. This observation was supported by the 2009 graduating cohort, who entered the program when the U.S. economic crisis was beginning and these students graduated from the program when the Crisis was at its peak. "It was during this period of time that the full impact of the financial crisis hit the multinational mixture of our full-time students and decreased the prospect of meaningful jobs at graduation. Graduates felt they had less choice. The overall depressing mood in the world economies, we believe, negatively affected this cohort" (Boyatzis et al., 2013, p 976).

Consequently, MBA programs are not immune to changes in the larger economics in which they exist. Boyatzis et al. (2013), determined, among other trends, that changes in world events, such as the 2008 financial crisis, has an effect on student learning. It is also likely that the COVID-19 pandemic, which brought about mandated social distancing and long periods of isolation and separation for faculty and students, might also have had an impact on student learning at the graduate studies level. This effect on student learning has a direct effect on instructor self-efficacy, that is, the instructor's perception of their teaching self-efficacy their belief about their ability to deliver a positive effect on student learning.

Summary

Prior to the pandemic, faculty realize that supporting students emotionally is integral to teaching and learning. During the pandemic when students were forced to adopt remote/online learning, new insights have been discovered. Diversity and inclusivity, exhaustion, and lack of focus, while always relevant to student learning, became even more prevalent during the pandemic. These characteristics and others, must be considered now in post pandemic course design and delivery. Of interest is the impact of the level of self-efficacy on how a faculty will react to situations such as a transition to online teaching. Faculty with high self-efficacy, facing negative outcome expectations, are more likely to make an effort to change their work environment and persist at their work. Whereas, faculty with low self-efficacy were less likely to persist in similar situations.

It is imperative to understand how the COVID-19 pandemic affected instructor efficacy in order to perform a check and balance that institutions are providing the necessary support for faculty in designing and delivering quality MBA courses. If online education is to remain competitive, faculty members must receive ongoing support needed to develop and administer meaningful online learning experiences for students with different learning styles and knowledge levels.

In the quest to determine if designing an effective MBA program has changed since the pandemic, looking at a faculty and student perspective related to Social Emotional Learning (SEL), is necessary. MBA studies and how instructor self-efficacy may have shifted since the COVID-19 pandemic is necessary to sustainable online MBA programs.

Chapter 3 METHODS

Research Design

This study hypothesizes faculty self-efficacy is lower in the post-Covid-19 pandemic period than in the pre-Covid-19 pandemic period. The study further hypothesizes there is a relation between faculty self-efficacy and graduate course quality. The first step is to determine if the COVID-19 pandemic had a direct effect on faculty self-efficacy. The next step will be to determine if there is a relationship between the effect on self-efficacy and the quality of course design before and after the pandemic. This study contributes to research by presenting empirical evidence of the effect of the COVID-19 pandemic on faculty self-efficacy and graduate course quality. This chapter describes the statistical methods used in the study and explains the process of selecting and gathering the secondary data.

Sample and Data Sources

The study will include two different testing samples. The first sample will be a small group of university faculty who will answer survey questions and serve as a pilot sample. This will support the actual study through data analysis to ensure the survey questions are relevant, understandable, and effective in retrieving data necessary to draw conclusions. The main study sample will be a voluntary participant pool of faculty who were teaching in the spring of 2020 when forced to transition from face to face to online course instruction. Potential participants will be contacted and invited by email to take the web-based survey.

Research on faculty efficacy presents a number of instruments used in various research instances. This study uses a combination of self-efficacy survey questions administered in prior research on self-efficacy. Research methods adaptations are taken from the teacher self-efficacy scale by Tschannen-Moran et al. (1998), variations of the MNESEOT scale that measured nurse educators' efficacy for teaching online (Robinia & Anderson, 2010), and finally, the computer skills section of the survey comes from Laver et al. (2012), which was modified from Compeau and Higgins (1995). The Laver et al. (2012) instrument is a better measure of everyday technology usage as well as the participants' confidence in their ability to use technology given supportive resources. The sample period is chosen so as to allow comparison of statistical results in the pre-pandemic and post-pandemic periods.

Validity and Reliability

This study uses a combination of survey instruments validated through previous studies.
One such study explored self-efficacy related to learning to use technology to perform specific tasks (Compeau & Higgins, 1995, Laver et al., 2012). Tschannen-Moran et al. (1998) used the Teachers' Sense of Efficacy Scale (also known as the Ohio State Teacher Efficacy Scale (OSTES)) as a self-assessment designed to gain a better understanding of the kinds of things that create difficulties for teachers in their school activities. Robinia and Anderson (2010) used the Michigan Nurse Educators Sense of Efficacy for Online Teaching instrument (MNESEOT), a 32-item survey that collected data from Michigan nurse educators employed at public accredited higher education institutions. This survey instrument in this study uses parts from each of these instruments to obtain data to answer the research questions.

Instrumentation

Robinia and Anderson (2010) used a 32-item MNESEOT tool, designed to survey the online teaching efficacy beliefs of nurse educators in the areas of student engagement, instructional strategies, classroom management, and use of computers. The survey instrument for this study will include seven demographic variables, four attitudinal variables and 24 efficacy questions that will be categorized into the same four efficacy factors as Robinia and Anderson (2010). Details of these components may be found in Appendix A.

A modification to the Robinia and Anderson (2010) instrument is in the fourth factor, Use of Computers, which will follow a series of questions as per Laver et al. (2012). These questions allow participants to report their computer self-efficacy as it relates to basic skills, web-based and media-based technologies. Each item is measured on a seven-point Likert scale with 1=strongly disagree to 7=strongly agree. An example of this part of the survey may be found in Appendix B.

The study will use a mix of descriptive statistics to explore the extent to which participants reported self-efficacy, and ANOVA and linear regression to model influences on the self-efficacy participants reported.

Data Collection

The study will be reviewed and approved by the research ethics board of Lander University. The use of Microsoft forms will allow for secure submission of surveys and for the researchers to anonymize the data. Respondents will be asked not to include any identifying marks or information within the survey.

Data are gathered via a survey instrument of specific questions that will provide statistical information to prove or disprove each hypothesis. The survey is a digital survey developed using Microsoft forms and based on the instrument used by Robinia and Anderson (2010). The survey consists of seven demographic questions, four attitudinal questions and 24 questions that ask participants to rate their perceived self-efficacy for online teaching on a Likert scale of 1-9 (1 being "nothing" and 9 being "a great deal").

Following Robinia and Anderson's (2010), after the data are collected, the variables will be combined and recoded into the efficacy subscales and scales. This step will allow the demographic and attitude variables to facilitate regression modeling while still representing the variance in the responses.

Summary

Data collection methods used in this study will follow previous research using instruments that have been validated and are relevant to the significance of this study. The survey instrument for this study will include seven demographic variables, four attitudinal variables and 24 efficacy questions that will be categorized into the same four efficacy factors as Robinia and Anderson (2010). The four efficacy factors are (1) for instructional strategies (2) classroom management (3) and student engagement (4) use of computers. A modification to the Robinia and Anderson (2010) instrument is in the fourth factor, Use of Computers, which will follow a series of questions as per Laver et al. (2012). These questions allow participants to report their computer self-efficacy as it relates to basic skills, web-based and media-based technologies.

Conclusion

Chapter One provides the framework for this quantitative study. The background is presented. The problem, purpose, and significance, research questions and hypotheses are identified. This research study seeks an understanding of the effect of the Covid-19 pandemic on faculty self-efficacy and if there is a correlation between faculty self-efficacy and course quality. The research questions are

RQ1: What affect did the COVID-19 pandemic have on faculty self-efficacy?

RQ2: Is there a positive correlation between faculty self-efficacy and [graduate] course quality?

A review of the literature in Chapter 2 shows that socio and environmental factors impact the level of self-efficacy on how a faculty will react to situations such as a transition to online teaching. Faculty with high self-efficacy, facing negative outcome expectations, are more likely to make an effort to change their work environment and persist at their work. Whereas, faculty with low self-efficacy were less likely to persist in similar situations.

It is imperative to understand how the COVID-19 pandemic affected instructor efficacy in order to perform a check and balance that institutions are providing the necessary support for faculty in designing and delivering quality MBA courses. If online education is to remain competitive, faculty members must receive ongoing support needed to develop and administer meaningful online learning experiences for students with different learning styles and knowledge levels.

In the quest to determine if designing an effective MBA program has changed since the pandemic, looking at faculty perspective related to Social Emotional Learning (SEL), is necessary.

Data are gathered via a survey instrument of specific questions that will provide statistical information to prove or disprove each hypothesis. The results of this research will provide new knowledge of course design quality and its effect on faculty self-efficacy. This new knowledge can be applied to the development of online MBA course design in the post-pandemic period to ensure that MBA courses programs offer leadership effectiveness competences for students and increased self-efficacy for faculty.

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APPENDIX A

Sample Survey Instrument for Current Study

Demographic variables include: gender, age, discipline, rank, semesters taught online, class size, and compensation. Measures specific to rank and compensation include:

Rank:
1=Teaching Assistant or Adjunct Instructor
2=Faculty Specialist I or Assistant Professor
3=Faculty Specialist II or Associate Professor
4=Master Faculty Specialist or Full Professor

Compensation:
0=Stipend & other monetary incentives
1=No additional compensation

The survey instrument also includes four attitudinal variable and measures:
1) Pressure Felt to teach online
No pressure
Little pressure
Some pressure

2) Satisfaction
Unsatisfied or neither satisfied nor
unsatisfied
Somewhat satisfied
Very satisfied

3) Future Interest
No, definitely not or prefer not
Yes, if I need to
Yes, definitely

4) **Perceptions of Student Learning** (perception of learning)
Strongly disagree
Agree
Strongly agree

Robinia and Anderson (2010) used a 32-item MNESEOT tool, designed to survey the online teaching efficacy beliefs of nurse educators in the areas of student engagement, instructional strategies, classroom management, and use of computers. Twenty-four self-efficacy questions are grouped into four factor categories.

Efficacy for instructional strategies
I. To what extent can you use a variety of assessment strategies?
2. To what extent can you provide an alternative explanation or example when students are confused?
3. To what extent can you craft good questions for your students?
4. How well can you implement alternative strategies in your classroom?
5. How well can you respond to difficult questions from your students?
6. How much can you do to adjust your lessons to the proper level for individual students?
7. To what extent can you gauge student comprehension of what you have taught?
8. How well can you provide appropriate challenges for very capable students?

Efficacy for classroom management
9. How much can you do to control disruptive behavior in the classroom?
IO. How much can you do to get children to follow classroom rules?
11. How much can you do to calm a student who is disruptive or noisy?
12. How well can you establish a classroom management system with each group of students?
13. How well can you keep a few problem students from ruining an entire lesson?
14. How well can you respond to defiant students?
15. To what extent can you make your expectation clear about student behavior?
16. How well can you establish routines to keep activities running smoothly?

Efficacy for student engagement
17. How much can you do to get students to believe they can do well in schoolwork?
18. How much can you do to help your students value learning?
19. How much can you do to motivate students who show low interest in schoolwork?
20. How much can you assist families in helping their children do well in school?
21. How much can you do to improve the understanding of a student who is failing?
22. How much can you do to help your students think critically?
23. How much can you do to foster student creativity?
24. How much can you do to get through to the most difficult students?

APPENDIX B
Sample Survey Instrument for Current Study related to Fourth Efficacy Factor of Use of Computers and Technology

Questions include:
1) I feel confident in my ability to
1. Use social media to have meaningful interaction
2. Use technology for entertainment
3. Use Internet tools to conduct research and find journal articles on a topic
4. Use technology to create an engaging presentation
5. Use new applications on my smart phone or tablet

2) Rate your satisfaction (Very dissatisfied (1); Dissatisfied (2); Satisfied (3) and Very Satisfied (4) with the technology support you receive from these sources:
1. Student
2. Instructor
3. Friend or colleague
4. Professional university IT support
5. Professional IT support (non-university)
6. Search Google, YouTube, etc.

3) Imagine you have found a new technology product that you have previously not used. You believe this product will make your life better. It doesn't matter specifically what this technology product does, only that it is intended to make your life easier and that you have never used it before. Rate your degree of confidence in using this new and unfamiliar technology by recording a number from 0 to 100 using the scale given below:

I could use the new technology...
______ 1. If there was no one around to tell me what to do as I go
______ 2. If I had never used a product like it before
______ 3. If I had only the product manuals for reference
______ 4. If I had seen someone else using it before trying it myself
______ 5. If I could call someone for help if I got stuck
______ 6. If someone else had helped me get started
______ 7. If I had a lot of time to complete the job for which the product was provided
______ 8. If I had just the built-in help facility for assistance
______ 9. If someone showed me how to do it first
______ 10. If I had used similar products before this one to do the same job

4) Please indicate below how you feel about the following statement: In general, I am interested in learning more about technology.
1. Strongly Disagree
2. Disagree
3. Agree
4. Strongly Agree

5) Please indicate how confident you feel in your ability use each of the following technologies. Rate your degree of confidence by recording a number from 0 to 100 using the scale given below:
I feel confident in my ability to . . .
______ 1. Use Social Media to have meaningful interactions

______ 2. Use technology for entertainment
______ 3. Use Internet tools to conduct research and find journal articles on a topic
______ 4. Use technology to create an engaging presentation
______ 5. Use new applications on my smart phone or tablet

6) Generally speaking, what is the first thing you do when you encounter problems with technology you use at the university. Please select the first thing that you would do.
1. Troubleshoot and resolve myself
2. Ask a friend or colleague for help
3. Seek professional IT support

7) When you need assistance with technology for university work, which of the following sources do you use? Check all that apply.
1. Student
2. Instructor
3. Friend or colleague
4. Professional University IT Support
5. Professional IT support (non-university)
6. Online resources (search google, youtube)

8) Rate your satisfaction with the technology support you receive from these sources:
1. Student
2. Instructor
3. Friend or colleague
4. Professional university IT support
5. Professional IT support (non-university)
6. Search Google, YouTube, etc.

FEASIBILITY OF MULTI-SENSORY ENVIRONMENTS OF VIRTUAL REALITY FOR NON-PROFIT ORGANIZATIONS HELPING PEOPLE WITH DISABILITIES

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ABSTRACT

Community engagement courses benefit non-profit organizations on diversity projects. Non-profit organizations engaged in courses involving students can evaluate projects of technology that can be helpful to disadvantaged people. The authors of the paper as an example evaluate feasibility findings from multi-sensory projects of virtual reality for people with disabilities at a local non-profit organization. The findings from projects of the students inform on the possibilities of virtual reality for non-profit organizations helping people with developmental and intellectual disabilities. The paper can be beneficial in contributing guidance to non-profit organizations helping people with disabilities on projects of technology involving community engagement students.

Keywords: Community Engagement Courses, Diversity, Multi-Sensory Environments (MSE), Non-Profit Organizations, People with Developmental and Intellectual Disabilities (IDD), Virtual Reality (VR) Applications, Virtual Reality (VR)

BACKGROUND OF PAPER

As a contrast to standard reality, virtual reality (VR) can be defined as a computer-created 3-dimensional environment of imagery that can be explored by people (Lorenzo, et.al., 2016). Multi-sensory environments (MSE) of virtual reality consist of head-mounted displays (HMD) in immersion, interaction or interactivity and perception of presence (Sundar, et.al., 2010), in exploring an authentic (AVR) and immersive virtual reality (IVR). Devices and displays of multi-sensory environments continue to be enhanced from applications of virtual reality, from firms as HTC Vive, Oculus Rift S and Touch and Sony Play Station VR (Cipresso, 2018b). Fields of virtual reality include architecture, design, disabilities (Furler, 2018), education (Schmidt, et.al., 2017), entertainment and gaming, hospitalization and learning, and even forums for the COVID-19 pandemic. Further highlights of modern perspectives from the technology include in entertainment, the Mona Lisa at the Louvre Museum (Carvajal, 2019, & Walt, 2019) in Paris, France, and in gaming, the improved Alyz: Half-Life (Acovino, 2020), Star Wars and Tales from the Galaxy's Edge. Growth in the technology is indicated in the investment of the market in virtual reality (Interrante, et.al., 2018).

As of 2018 estimates in the environments are $7 billion, $2.3 billion in the hardware and $4.7 billion in the software of virtual reality (Bonasio, 2018). Estimates of people on multi-sensory environments are an exceptionally high 171 million in 2018, expanding from a low 6.7 million people in 2015 on virtual reality (Bonasio, 2018). By 2022 estimates of the environmental hardware market are a high $16.3 billion in practical technology (Lombard, 2019) and are even hyped as high as $209 billion in the industry of virtual reality (Gallagher, 2019). Benefits of the multi-sensory environments can be applied in continued applications in the lives of people (Soulliere, 2017), as in Exercise Your Brain and Play with Friends on Oculus Go, in enhancing knowledge (Freina, & Ott, 2015) from virtual reality systems, in which people might practice relevant scenarios for learning living skills. The benefits of virtual reality, and of technology (Lay-Flurrie, 2020), can be even applied with caution to people with disabilities (Cahalane, 2017).

Clinical dimensions of virtual reality can create educational experiences for people with disabilities. Multi-sensory environments can engage people with disabilities in applications, in pseudo realistic scenarios of virtual reality, as in gaming solaces (Miller, 2020) and in social skills studies, through virtual tours. However, the development of the environments may not be considering the nuances of the technology for people with disabilities, if in not including non-profit organizations and people with disabilities in the developmental process of virtual reality. In this paper, the authors of a community engagement course continue to evaluate the feasibility of applications of multi-sensory environments of virtual reality for people with developmental and intellectual disabilities (IDD) at a local non-profit organization, as in the literature (Wang, et.al., 2018). This paper gives guidance as to the possibilities of the promise of virtual reality for those with disabilities.

INTRODUCTION TO PROJECTS

This paper evaluates the feasibility of multi-sensory environments, from a community engagement course at Pace University, with the AHRC New York City (NYC) non-profit organization. The amended course focus, from an earlier Web Design for Non-Profit Organizations course syllabus, is in engaging higher-functioning (i.e. less impaired) people with developmental and intellectual disabilities with the non-profit organization in interaction with mentor multi-disciplinary paired students of the university. The projects of technology are including applications of virtual reality, which are explored for feasibility from spring 2020 in this paper, and from winter 2018 / spring 2019 (Lawler, Ng, Patel, & Cowell, 2020) and spring 2018 (Lawler, Ng, & Patel, 2019) from papers previous to this study.

For this paper from spring 2020, the authors explore the comfortability foundations of the technology from best-in-the-field low cost virtual reality (Cipresso, 2018a), from the applications explored in winter 2018 / spring 2019 and spring 2018 and from other applications introduced in spring 2020. The applications of the multi-sensory environmental projects of virtual reality in spring 2020 include the All-in-One VR Gaming head-mounted display Oculus Rift (Figure 1 in Appendix) for the below:

- 3D Organon Anatomy VR (Figure 2);
- Galaxity (Figure 3);
- Guided Meditation (Figure 4);
- Jam Session VR (Figure 5);
- Ocean Rift (Figure 6);
- Oneiric Masterpieces – Paris (Figure 7);
- Paint VR (Figure 8); and
- Star Chart (Figure 9).

The projects of virtual reality in spring 2020 were identified from the field as state-of-the-art on the Alienware M15 (Graphics Amplifier) Gaming and Laptop Windows 10 Home (Intel Core 8th Generation 16GB) English Operating System, by the students, of which the first and third authors are the students of this study.

From the papers previous to this study, the evaluations of the projects of virtual reality, by the people with developmental and intellectual disabilities in spring 2020 with their paired students, are from comfortability factors consistent for experiences by the people with the students. The design factors are ease of use in interfacing with the applications, flexibility of use in navigating, information perceptibility in navigation, intuitiveness in processing application(s) scenarios without instructions, and limited physical requirements without restrictions of the Oculus technology. The evaluations from the factors in spring 2018 and winter 2018 / spring 2019, and recently in spring 2020, of the projects are formed in principles of universal design in the literature.

FOCUS OF PAPER

The focus of the projects is to continue evaluations of the feasibility of multi-sensory environments for people with disabilities at the local non-profit organization, particularly as the technologies for virtual reality are formulated further in the industry (Minocha, 2015). How might multi-sensory environments of immersive virtual reality learning environments (IVRLE) be a foundation for improving later the learning of living skills of people with disabilities? (Tacgin, 2020) How might multi-sensory environments of virtual reality be a foundation for improving later the learning of, and training in, social skills subjects by, and collaboratively with, people with developmental and intellectual disabilities? The focus of the projects in spring 2020 is to essentially explore the efficacy feasibility of the foundations for further investment in the technology by the nonprofit organization with the university, as consumers (Roush, 2020), firms in the industry (Browning, 2020) and schools (Mathewson, 2019), increase investment in this technology. As multi-sensory environments of virtual reality are in their infancy, this paper is particularly timely.

METHODOLOGY OF PAPER

This paper continues to explore the comfortability in the feature functionality of the Oculus Rift System. The multi-sensory environments of the projects are focused on the aforementioned applications of the system in the community engagement course in spring 2020, but the environments included the applications of the projects in winter 2018 / spring 2019 (Lawler, Ng, Patel, & Cowell, 2020) and spring 2018 (Lawler, Nng, & Patel, 2019) that had a lesser number of projects. The projects included people with disabilities chosen by the non-profit organization and eager to engage the projects and students, facilitating professional staff from the organization, and the course students from the university.

Each of the aforementioned n=8 applications were evaluated in the course in a January - March pandemic-shortened spring 2020 by n=21 higher-functioning young adults with developmental and intellectual disabilities, with the critical aid of n=9 non-profit organizational staff and the n=19 paired students attending the course. Each of the n=21 people with disabilities evaluated each of the n=8 applications on the aforementioned n=5 comfortability factor features of the applications, in durations of 13-17 minutes per applications, from a Likert-like perception scaling of (5) very high, (4) high, (3) intermediate, (2) low to (1) very low in comfortability, or (0) in no comfortability of the features. Each of the n=9 staff and the n=19 paired undergraduate students were helping the n=21 young adults with developmental and intellectual disabilities, as needed with evaluative formatted scripts, in the immersions of the young adults on the hardware and software systems, with the scripts previously sampled in spring 2018 and winter 2018 / spring 2019. Few of the n=21 young adults were knowledgeable with these largely non-gaming systems of virtual reality prior to spring 2020. The experiences on the systems, as in winter 2018 / spring 2019 and spring 2018, were hosted in a large room of navigational space in approximate 2.5 hour sessions at the university weekly.

The descriptive findings from the projects were informally interpreted qualitatively, in semi-structured interviews of reflections of the people with disabilities by the observational staff and by the first and third co-author students, and quantitatively, by the first author and the second author-co-manager professor on Excel spreadsheets. The findings confined to the foundational functionality of the applications, as in the previous studies, were confidential as to the identity of the people with disabilities, and the impact of the pandemic in limiting the semester did not critically impact the integrity of the study. The methodology in this paper, in involving a small number of people, was similar to other community engagement courses and to other projects of virtual reality in other scholarly studies referenced in the Appendix.

ANALYSIS OF FINDINGS FROM EXPLORATORY PROJECTS

The analysis of the community engagement course findings from the exploratory projects of the multi-sensory environments in spring 2020 is continuing to indicate comfortability engagement perceptions of the n=21 people with disabilities.

Findings are indicating a high of means of 4.70 / 5.00 in the Star Chart application (app), and a low of means of 2.30 in the Oneiric Masterpieces – Paris app, in perceptions of satisfaction with virtual reality. In the factors, Jam Session VR app is also indicating a high of means of 4.60 in ease of use in interfacing, flexibility of use, information perceptibility in navigating the app and limited physical requirements without restrictions of the technology, and a low of means of 4.00 in intuitiveness in processing the app scenarios without instructions, in the perceptions of the n=21 young adults with developmental and intellectual disabilities. Oneiric Masterpieces – Paris app is indicating a low of means of 2.30 to a high of means of 4.00, in the factors of the projects. Almost all of the apps, 3D Organon VR, Guided Mediation, Jam Session, Ocean Rift, Oneiric Masterpieces – Paris, Paint VR and Star Chart (7 / 8 apps), are indicating a high of means minimally of 4.00 or higher, in the factor instances of the projects.

The findings from the projects in spring 2020 are in Tables 1a and 1b of the Appendix.

The comfortability findings in winter 2018 / spring 2019 (Lawler, Ng, Patel, & Cowell, 2020) are in general favorably similar to the findings of the spring 2020 study, indicated in a high of means of 4.12 – 3.15 / 5.00 in the 3D Organon VR Anatomy app, and a low of means of 3.12 – 3.73 in the Ocean Rift app, in the perceptions of satisfaction of the other n=24 people with disabilities in winter 2018 / spring 2019. Star Chart app is indicating at a high of means of 3.72 – 3.72 (a distinct group), and in contrast to the Ocean Rift app indicating at its low of means of 3.12 – 3.73, in the multi-sensory environmental perceptions of the n=24 people with developmental and intellectual disabilities in winter 2018 / spring 2019. All of the apps (3 / 3), 3D Organon VR, Ocean Rift and Star Chart, are indicating a means minimally of 3.00 (i.e. 3.12) in the factor instances (5) from ease of use to limited physical requirements in this limited study in winter 2018 / spring 2019, as further indicated in Table 2.

The comfortability findings for the projects in fall 2018 (Lawler, Ng, & Patel, 2019) are favorably similar to those of the winter 2018 / spring 2019 and spring 2020 studies, in indicating a high of means of 4.63 / 5.00 in the Star Chart app, and a low of the means of 3.63 in the 3D Organon app, on the Oculus system. Star Chart app is indicating at its high of the means of 4.63, and a low of a means of 4.13, in the factor perceptions of the n=13 people with developmental and intellectual disabilities, on the Oculus projects. All of the apps (3), 3D Organon, Ocean Rift and Star Chart, continued in indicating a means minimally of 3.00 (i.e. 3.63), or further in a means minimally of 4.00 (i.e. 4.00) or higher on the Ocean Rift and Star Chart apps, on the factor instances of the Oculus system, and a means minimally of 3.00 (i.e. 3.50) or higher, on almost all of the factor instances on an alternate HTV Vive System, as indicated in Tables 3a and 3b of this also limited fall 2018 study.

For the factors analyzed on the apps on the Oculus system in spring 2020, the higher-functioning (i.e. less impaired) n=21 young people with developmental and intellectual disabilities are indicating favorable foundational perceptions of satisfaction.

Ease of use and high latency in interfacing in the apps are indicating a high of means of 4.60 / 5.00 (Jam Session) to a low of means of 3.00 (Galaxity and Oneiric Masterpieces – Paris); effortless, enjoyable and error-free flexibility of use in navigating the apps with aviators, and without staff and students, is indicating a high of means of 4.60 (Jam Session) to a low of means of 2.60 (3D Organon and Oneiric Masterpieces – Paris); and information perceptibility in navigating the apps is indicating a high of means of 4.60 (Jam Session) to a low of means of 2.30 (Oneiric Masterpieces – Paris).

Intuitiveness in naturally processing the apps scenarios without instructions of the staff or students is indicating a high of a means of 4.60 (Ocean Rift) to a low of a means of 3.00 (3D Organon, Guided Mediation and Oneiric Masterpieces – Paris); and limited physical posture requirements of the head-mounted displays and peripherals of the system are favorably indicating at a high of means of 5.00 (3D Organon) to a low of means of 2.80 (Galaxity).

Findings are indicated in Tables 1a and 1b. Findings of spring 2020 are generally similar on factor specifics to those of winter 2018 / spring 2019 and fall 2018 in Tables 2, 3a and 3b on virtual reality.

From the factors favorably perceived by the n=21 people with developmental and intellectual disabilities in spring 2020, the young adults with disabilities are indicating fun in immersion and in interactivity, essentials of virtual reality with visualization (Wang, 2012); and importantly they are indicating interest in learning, in navigating in the apps in feelings of both physical reality and virtual reality, or in a presence of realism of "being there", which is also evident in literature studies (Herrero, & Lorenzo, 2019) and is indicated in the winter 2018 / spring 2019 and fall 2018 studies.

The findings from the multi-sensory environments are however not indicating the learning of skills by people with disabilities navigating the technology. The findings are informing non-profit organizations that the comfortability foundational perceptions of the n=19 less impaired people with disabilities (and the other n=37 people with disabilities) might posit compelling possibilities for further pursuing recent virtual reality (Brewster, 2020). Such possibilities might position more reviews of skills in sociality and in subjects that might be learned from virtual learning environments of virtual reality.

Finally, the analysis of the findings from the n=19 students on the projects is indicating perceptions notably positive in reflections qualitatively to those with disabilities, as the students are learning collaboration, communication, diversity, empathy and flexibility skills with those they would not have met without the community engagement course of spring 2020 on virtual reality.

IMPLICATIONS OF PAPER

The comfortability in the community engagement course in multi-sensory environments of the projects is consistent with earlier findings. The engagement of the people with disabilities in the functionality on the applications of the projects is evident in the findings in spring 2018 (Lawler, Ng, & Patel, 2019) and winter 2018 / spring 2019 (Lawler, Ng, Patel, & Cowell, 2020), as in spring 2020. The perceptions of the people with developmental and intellectual disabilities are favorable generally as to the immersion and the interactivity of the applications of the projects, as already in their perceptions of applications of gaming, increasing interest in virtual reality. The applications on the system of virtual reality are not even intimidating in the perceptions of the people with disabilities. The implication of the findings is that multi-sensory environments might inform non-profit organizations on the foundational opportunities of virtual reality systems for helping those with disabilities.

The feasibility of multi-sensory environments for people with disabilities is evident foundationally in the semesters. The focus on applications of projects of virtual reality helping people with disabilities however is limited in the literature. The ideal "killer apps" applications for people with disabilities on virtual reality is also limited in the literature. Nevertheless, non-profit organizations, frequently impeded by financial limits from the pandemic, might incrementally investigate for their people possibilities of new technology (e.g., Pico Interactive Neo 2 Eye VR Headset) in a prototyping study, with an educational institution, such as the Pace University Seidenberg School of Computer Science and Information Systems, which might have funded investments in research in the technology. The implication of the findings of this paper is that multi-sensory environments might be investigated by non-profit organizations for future investment in the potential of virtual reality.

The potential of multi-sensory environments is evident in innovations (Virtual Reality Insider, 2020). Entrepreneurial firms are evidently beyond hype in initiating investment in the hardware and the software of virtual reality (The Economist, 2020). Firms are initiating ever lower cost, maturing and powerful virtual reality for people in general (Gurman, 2020, & Sullivan, 2020), and for higher-functioning people with developmental and intellectual disabilities (Roberts, 2019), that were researched selectively by the spring 2020 students. Firms in the industry are further initiating new reality simulation systems of virtual reality for niche populations in society, as highlighted in practitioner publications, such as AR.VR Journey (Figure 10). The findings of this paper as to the foundational possibilities of skills that might be learned by people with disorders on maturing virtual reality, and that might posit review by non-profit organizational specialized staff, are other implications of this paper.

Though the possibilities of multi-sensory environments for people with disabilities learning skills are not proven in research, the progression of the technology offers potential for pursuing virtual reality (Player-Koro, et.al., 2018). The possibilities of the technology in the people with disabilities learning practical skills, in sociality and in subjects, can be more productively reviewed by non-profit organizational specialized teachers. The problems of multi-sensory environments are in the content insufficiency of reality simulation systems in learning skills (Papanastasious, et.al., 2019) and in the contexts culturally of skills training (Yildirim, et.al., 2018), that if reviewed (Minocha, et.al., 2017) and if solvable, with specialized teachers and technologists, might justify more involvement of non-profit organizations in the progression of virtual reality, as also indicated in spring 2018 and winter 2018 / spring 2019. The gamification information issue in learning scenarios of skills might be more prudently reviewed by specialist teachers and therapists (Fransson, et.al., 2020), not geek specialty technologists of virtual reality. Given however involvement of teachers, technologists and therapists, the findings of this paper posit implications of the technology of virtual reality for skills training of those with disabilities.

Lastly, the community engagement courses are benefiting the students of Pace University. The evaluations of the spring 2020 students continue to be positive in final project reflections, as in the pre-pandemic reflections of the winter 2018 / spring 2019 (Lawler, Ng, Patel, & Cowell, 2020) and spring 2018 (Lawler, Ng, & Patel, 2019) students. The evaluations of the students, in the amended Web Design for Non-Profit Organizations courses, are indicating increased learning of the functioning of non-profit organizations in helping the people with developmental and intellectual disabilities as mentors with technology, such as virtual reality; and the students are indicating increased mentoring skills in supporting the people with disabilities. The findings of this spring 2020 study posit the learning potential of projects for Generation Z students from involvement with non-profit organizational technologies. The implications of the overall papers since spring 2018 are that instructors might initiate more projects of service in technologies with undergraduate students.

LIMITATIONS OF PAPER AND OPPORTUNITIES IN RESEARCH

The feasibility findings on the applications of multi-sensory environments for people with disabilities are constrained by the limitation of the sample sizes. The findings are constrained by the limitation of mostly people with developmental and intellectual disabilities, and non-distinctions of these disabilities, and by the limitation that not included other people with physical disorders. The findings are further constrained by the limitation of a foundational interpretation that is not imputed to be an interpretation of learned skills from the technology. Limitations moreover include the interventions on the projects of only specialist staff and students but not specialized teachers. Other limitations include the functionality of the hardware of the systems that may not be the hyped lightweight of recent state-of-the-art technology of virtual reality.

Though the findings cannot be generalized without caution, this paper for the period of spring 2020 posits possibilities for more people with disabilities at other non-profit organizations. Possibilities for neurodevelopmental people with disabilities are in the research. The potential of multi-sensory environments as sensible for learning living skills, or other skills of sociality studies, for other niche populations is postulated in the research (Marcus, 2020). Non-profit organizations helping heterogeneous people with disabilities, but financially limited in a pandemic or post-pandemic period, might however incrementally pursue research in the potential of lower cost non-gaming multi-sensory environments, integrating internal specialized teachers and technology vendors, in new studies. The field of virtual reality is fertile for further possibilities in research for those with disabilities.

CONCLUSION OF PAPER

The community engagement course of this paper contributes feasibility findings as to the perceptions of digital multi-sensory environments for projects with people with disabilities. Findings from the projects denote the educational foundational potential of the technology for helping people with disabilities in limited studies at a university and with a non-profit organization. Interventions of more non-profit organizational specialist staff are also denoted in this paper as a prerequisite to the pursuit of virtual reality with those with developmental and intellectual disabilities. The people with disabilities and staff, and particularly the students on the projects, learned more of virtual reality than on other community projects of service in the university. In summary, this paper gives guidance as to the reality of this technology that might inspire other non-profit organizations helping people with disabilities to be on investigatory projects of virtual reality involving students of a research university.

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APPENDIX

Figure 1: Oculus Rift System

Figure 2: 3D Organon Anatomy VR Application

Figure 3: Galaxity Application

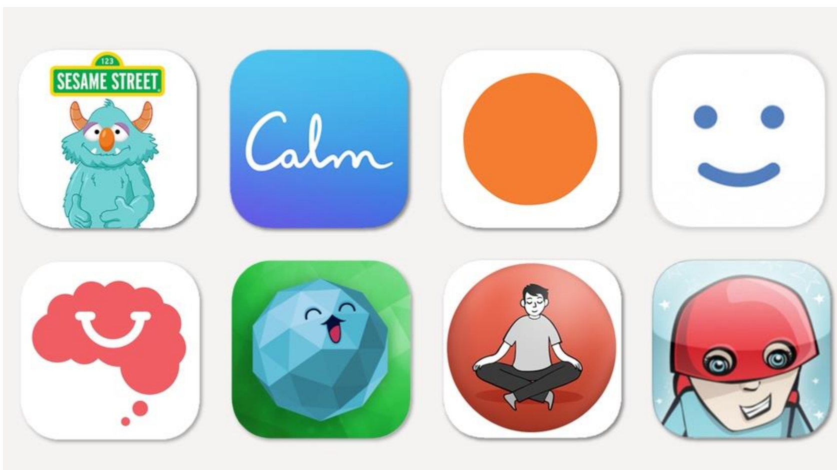

Figure 4: Guided Meditation Application

Figure 5: Jam Session Application

Figure 6: Ocean Rift Application

Figure 7: Masterpieces – Paris Application

Figure 8: Paint VR Application

Figure 9: Star Char Application

Figure 10: www.arvrmagazine.com

Table 1a

Applications Means

Comfortability Perceptions

Spring 2020 - Oculus System

	3D Organon	Galaxity	Guided Mediation	Jam Session
Ease of Use in Interfacing	3.60	3.00	4.00	4.60
Flexibility of Use in Navigating	2.60	3.00	3.50	4.60
Information Perceptibility in Navigating	3.00	3.00	3.50	4.60
Intuitiveness in Processing Scenarios without Instructions	3.00	3.50	3.00	4.00
Limited Physical Requirements without Restrictions	5.00	2.80	4.50	4.60

Legend: (5) very high, (4) high, (3) intermediate, (2) low and (1) very how in comfortability of the factor features of the applications

Note: Spring 2020 included n=21 young adults with developmental and intellectual disabilities.

Table 1b

Applications Means

Comfortability Perceptions

Spring 2020 – Oculus System

	Ocean Rift	Oneiric Masterpieces – Paris	Paint VR	Star Chart
Ease of Use in Interfacing	3.30	3.00	3.80	3.50
Flexibility of Use in Navigating	3.60	2.60	3.80	3.50
Information Perceptibility in Navigating	4.30	2.30	3.00	3.50
Intuitiveness in Processing Scenarios without Instructions	4.60	3.00	4.00	3.20
Limited Physical Requirements without Restrictions	4.00	4.00	4.00	4.70

Note: Spring 2020 included n=21 young adults with developmental and intellectual disabilities.

Table 2

Applications Means

Comfortability Perceptions

Winter 2018 / Spring 2019 – Oculus System

	3D Organon		Ocean Rift		Star Chart	
	Groups 1-2 (Group 2)		Groups 1-2 (Group 2)		Groups 1-2 (Group 2)	
Ease of Use in Interfacing	3.15	4.12	3.12	3.73	3.72	3.72
Flexibility of Use in Navigating	3.15	4.12	3.12	3.73	3.72	3.72
Information Perceptibility in Navigating	3.15	4.12	3.12	3.73	3.72	3.72
Intuitiveness in Processing Scenarios without Instructions	3.15	4.12	3.12	3.73	3.72	3.72
Limited Physical Requirements without Restrictions	3.15	4.12	3.12	3.73	3.72	3.72

Note: Winter 2018 / Spring 2019 included n=24 mid-aged to young adults with developmental and intellectual disabilities (in n=13 in group 1 and n=11 in group 2).

Source: Lawler, Ng, Patel, & Cowell, 2020

Table 3a

Applications Means

Comfortability Perceptions

Spring 2018 – Oculus System

	3D Organon	Ocean Rift	Star Chart
Ease of Use in Interfacing	3.75	4.50	4.63
Flexibility of Use in Navigating	3.75	4.38	4.38
Information Perceptibility in Navigating	3.63	4.25	4.13
Intuitiveness in Processing Scenarios without Instructions	3.63	4.38	4.38
Limited Physical Requirements without Restrictions	3.75	4.13	4.00

Note: Spring 2018 included 13 younger adults with developmental and intellectual disabilities (i.e. Autism Spectrum Disorders).

Source: Lawler, Ng, & Patel, 2019

Table 3b

Applications Means

Comfortability Perceptions

Spring 2018 – HTV Vive System

	3D Organon	Ocean Rift	Star Chart
Ease of Use in Interfacing	2.50	–	3.50
Flexibility of Use in Navigating	4.00	–	3.75
Information Perceptibility in Navigating	3.67	–	3.50
Intuitiveness in Processing Scenarios without Instructions	4.33	–	2.75
Limited Physical Requirements without Restrictions	3.67	–	4.75

Note: Spring 2018 included 13 younger adults with developmental and intellectual disabilities (i.e. Autism Spectrum Disorders).

Note 1: Ocean Rift was not included with the HTV Vive System due to elapsed (longer) playing of the other applications in the study.

Note 2: HTV Vive System was not included in the previous studies due to limitations of its peripherals in the studies.

Source: Lawler, Ng, & Patel, 2019

Response to the Reviewers' Questions (Final Submission paper included below)

Thank you for your feedback and for taking the time to read our paper. These are great questions, and they have spurred future research ideas. Please see our response to your questions below:
Response to Reviewer #1 questions:

1.) Does the methodology require neutralizing (not sure if that is the right word) the profits for the business cycle? If an increase in a Greenscore produces, for example, a 10% increase in profits, but the market profits are up 20%, can it be said that a higher Greenscore helped?

Thank you for great questions. We only looked at the direct relationship of whether higher Greenscores lead to higher profits. We would believe that an increase in Greenscore resulting in an increase in profits would have a positive impact on the market profits. Our believe is based on several studies suggesting that higher corporate sustainability can benefit bottom line. The high rates of return should accompany high market profits because of lower operating costs and greater marker power as a direct increase of consumer preference for greener product. The company's resource cost savings are directly reflected to higher revenues and allows for increased competition. Thus, corporations that are greener/more sustainable in their processes are expected to attain the competitive advantage by means of developing more efficient use of internal resources, customer preference for greener products, and further argue that this will create economic value through exploiting opportunities and neutralizing threats.

2.) What is it about greenness that leads to greater profits? I am not aware of the Greenscore of any of the companies whose products I buy. Are most people? What is it about greenness that influences consumer behavior? And how does greenness affect behavior?

Thank you for another great question. There is quite a bit of research on green purchase behavior, and various prevailing motives and barriers influencing purchase decision-making of green products. Consumer's environmental concern along with products functional attributes are main contributing factors of consumer green purchase behavior. Consumers are more aware of the severe ramifications of environmental damage including global warming, pollution, and decline in flora and fauna. Consumers possess the capability to prevent or decrease environmental damage by purchasing green products. Previous studies have found that consumers have a positive attitude towards environmental protection and have expressed their demand for green products to companies. As a result, consumers are considering the environmental impact of purchasing, using, and disposing of various products which has led the increase in demand for green products and services. Additionally, many countries are urgently working on minimizing the harmful environmental impact and imposing certain requirements on corporations to implement sustainability and environmental protection at all stages of production.

A company's greenness was measured using Newsweek's "Greenscores" grounded on three components, environmental impact, management, and disclosure. The environmental impact score (45% of the score) involves over 700 items that standardized the overall environmental impact of a company's global operations. The environmental management score (45%) assesses how a company manages its environmental footprint (i.e., its environmental policies of both its own operations and its suppliers and contractors). The environmental disclosure score (10%) evaluates how transparent the company is in its sustainability reporting and initiatives such as the Global Reporting Initiative. Greenscores provide a method of measuring a company's greenness and impact they have on environmental protection.

3.) Some of the writing is awkward, especially the top half of page 4.

The writing was revised and new submitted.

4.) The latent variables section is good. Maybe more emphasis should be given to the confirmatory factor analysis (structural equation modeling) section of the paper.

The writing was revised and new submitted.

Response to Reviewer #2 questions:

1.) Is the increase in profitability that follows an increase in green-ness a one-time increase, or are the higher profits sustained?

Higher profits would be expected to maintain as the initial investment in corporate sustainability processes would allow for long term economic benefits.

2.) This paper examines profits. What is the impact on firm value? Does the stock price increase when a green investment is announced?

Thank you for a great question. Investors are starting to align their values with investing because of environmental protection awareness. The question of whether sustainable companies more valuable has become increasingly predominant as corporations seek to increase their financial health through sustainability focused processes demanded by the environmental resources, climate change, and consumer and governmental demands. One such measure is corporate social responsibility (CSR). An article written by Chitru S. Fernando, Mark P. Sharfman, and Vahap B. Uysal titled "Corporate Environmental Policy and Shareholder Value: Following the Smart Money" (2017), analyzes the effect of corporate sustainability policies and investments on shareholder value. The authors state that sustainability policies and investments benefit stakeholders when they lessen the likelihood of negative and costly outcomes by reducing the exposure of company to environmental risk. Shareholders undervalue companies with high environmental risk as there is an increase possibility of negative evens including hindering company's reputation, costs resulting from environmental harm, and even lawsuits. These outcomes would increase costs and increase company's risk, resulting in stock price decline.

A study conducted by Xin Deng, Jun-koo Kang, and Buen Sin Low titled "Corporate Social Responsibility and Stakeholder Value Maximization: Evidence from Mergers," (2013) examined a large sample of mergers in the U.S. to determine if corporate social responsibility (CSR) creates value for acquiring firms' shareholders. This article further reflects the importance of CSR in US firms' operation, where socially responsible investing (SRI) has also become an increasingly important investment vehicle in the US. The study suggests that when compared with low CSR acquirers, high CSR acquirers realize higher merger announcement returns, higher announcement returns on the value-weighted portfolio of the acquirer and the target, and larger increases in post-merger long-term operating performance. Furthermore, the study findings show that if the acquiring firm during a merger has high CSR, the firm outpaces low-CSR acquirers during mergers in the following extents: higher announcement stock returns for acquirers, larger increases in long-term operating performance and stock returns, and higher likelihood and shorter duration of deal completion. This study further implies that an increase in the firm value is attainable because of the managerial choice to invest in CSR, which in return will benefit stockholders in thein the long run. Therefore, we expect stock prices to increase when a green investment is announced.

GREENESS' RELATIONSHIP TO FINANCIAL SUCCESS

Paper Proposal

Submitted to SEINFORMS 2021
57th Annual Meeting

by

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ABSTRACT

Corporate sustainability efforts have been gaining attention both from consumers and businesses. For businesses, several potential benefits are resulting include social, economic, and environmental benefits. While many studies have indicated various benefits, there is a considerable level of ambiguity in affirming that greener processes result in higher profits. This study examined whether green initiatives lead to greater profit or change in profits using longitudinal data. The study utilized the Newsweek "Greenscores" to measure greenness. Profits were obtained for Fortune 500 publicly traded companies for the years 2011 through 2019. Level of greenness and change in greenness were used as the independent variables of the analysis. The study utilized cross-lagged regression to determine whether the previous Greenscore affects later company profits or whether the change in greenscore affected profits. Cross-lagged regression allows for different time lags. Thus, the study was able to examine whether greenness (or change in greenness) affects profitability one, two, or three years later. The cross-lagged regression did not find the absolute amount of greenness that affected the profit at 1, 2, or 3 years later. A Latent Change Score Model showed that change in greenness predicted profit at 1, 2, and 3 year time lags. The change in greenness seems to be more important to profits than the absolute level. With this data, companies investing more in green initiatives saw an increase in profits in the next fiscal year. That is, companies that changed more in their greenness had significantly greater profits a year and two years later. This research provides a first step for analyzing the relationship between corporate environmental consciousness and profitability.

A growing concern with environmental mistreatment accentuates the adverse impact on economic and social prosperity. Several studies point to the significant magnitude of environmental damages resulting from excessive misuse of natural resources, unsustainable methods of manufacturing and consumption, which are the basis of many environmental, social, and economic concerns [11] [5]. It became evident that increased exploitation of natural resources to realize economic development poses a serious threat to the well-being of our own and future generations [4]. As a result, many companies realize an urgent necessity to incorporate economic prosperity with environmental and social interests [26]. Specifically, economic activities should add value without harming the ecological system alongside increasing global sustainability efforts. Environmental and global sustainability should take a presence in all levels of organizational processes.

To balance economic and environmental activities in response to sustainability, many companies have identified the significance of being low-carbon and environmentally preventive by acquiring and implementing 'green' strategies. What is more, strict environmental regulations generate innovation as well as cleaner technologies and environmental improvements [31]. Alongside these environmentally preventive efforts, previous studies suggest that environmental regulations improve efficiency and cause cost savings that overcompensate for both the regulations compliance and innovation [27] [32]. The environmental-preventive views and the emergence of green consumption and social pressures have made companies more aware of the importance of green business [9] [22]. Consequently, the production of environmentally-friendly products increased by more than 500% in the period from 2007 to 2009 [30]. Thus, given the negative environmental consequences, amplification of environmental protection efforts would increase both economic and social value**.** Crifo, Escrig-Olmedo, and Mottis [7] suggest that the main reason corporations should focus on their environmental and social performance is the general conception that companies with greater levels of corporate sustainability are inclined to reach greater economic profits**.** The integrative view on corporate sustainability and corporate greenness further accentuates the positive relationships of economic, environmental, and social associations [12]. Pavláková, Dočekalová, Kocmanová and Koleňák [25] interpret these views into increased corporate responsibility. The authors state that companies with higher corporate responsibility can attain innovative and motivated employees, which is reflected in the economic gains in terms of positive corporate image, increased customer loyalty, reduced costs, competitiveness, and new opportunities. Thus, greater efficiency and protection of natural resources are essential for economic growth [25].

Environmental protection efforts are often less prioritized as financial benefits remain the main focus for many companies [12]. Also, due to initial high costs associated with the implementation of green processes and some of the uncertainties associated with green innovation, many companies are hesitant in becoming greener as there are not convinced their green innovation efforts will yield higher profits. This study analyzed the relationship between profitability and green efforts.

Sustainability efforts should generate economic value and higher profits attributable to natural resource protection, cost-effectiveness, consumer demands, positive corporate image, and competitiveness [33]. Corporate initiatives should strive to achieve sustainable strategies that combine economic, environmental, and social concerns while bearing in mind present and future generations' needs. Thus, corporations are striving to accomplish long-term benefits by actively engaging in sustainability-related efforts and formulating these efforts into every aspect of corporate strategy [25]. However, empirical results are inconclusive of the connotation between environmental impact and financial performance. That is, corporations do not know whether sustainability initiatives translate to financial value. As a company is unlikely to adopt sustainability initiatives with uncertain effects, this lack of knowledge hinders efforts to reduce corporate bearings on the environment.

Among the sustainability challenges faced by many companies, the initial cost of sustainability initiatives implementation is based on the short-term impact on the bottom line, where the payback period for sustainability investment often tends to exceed the justification for the environmental investment based on the long-term rewards. Thus, this study has focused on determining whether green companies that have increased sustainability initiatives have increased their profitability as a result. To the extent that

Greenscores affect profitability at a later point in time, and whether Greenscores affect change in profitability are crucial if corporate efforts to draw attention to sustainability operations development are to be increased.

The purpose of this quantitative study is to establish the extent if any, Greenscores affect profitability at a later point in time and do higher Greenscores affect the change in profitability. To proceed with such a study, one approach is to use companies' "Greenscoress" data to evaluate the profitability of companies with greater "Greenscoress" in comparison to companies with lower "Greenscoress." The data was extracted from the Newsweek "Greenscores" data of the Fortune 500 companies. Furthermore, companies' profits and Greenscores indicators were evaluated by applying statistical methods of regression to determine whether there are any linkages between greater green operations and profitability.

This quantitative study used the profit data collected from 2011 to 2019 from the Newsweek "Greenscore" based on a sample of Fortune 500 publicly traded companies as the legal obligations necessitate the detailed release of the company's profits and expenditures. To ensure adequate power, a power analysis was conducted, and with medium effect size, and 110 companies, power equaled over 80 percent, which is considered sufficient power. The study utilized as much of the data found in Fortune 500 as possible to ensure generalizability to all companies.

Since this study used existing data, some potential confounds, such as experimenter or participant effects, were not applicable. Construct validity is probably the biggest threat to this study as the reliance is on Newsweek's Greenscore as the main measure of 'greenness.' An experimental study is not possible to control for all variables. Thus, a correlational study design using regression analyzes these real-world relationships.

Profit is a continuous variable with an interval scale of measurement. The profit variable has an absolute zero, and ranges are from negative infinity to positive infinity. The profit variable is used to assess the profitability of companies with higher Greenscoress compared to companies with lower Greenscores incurred during a period of 2011 to the 2019 year. It is expected that profit will be normally distributed, but this will be assessed in the descriptive statistics. Thus, these variables are on an interval scale of measurement. These variables are expected to be normally distributed.

The financial performance of companies was indicated by total profits. These financial outcomes are the core measures when evaluating green and non-green companies. The analysis assessed both current and historical financial performance data to investigate the cause-effect correlation between green to non-green operations. The impact of "Greenscores" was examined to establish whether higher "Greenscores" result in higher profits. This research used Newsweek "Greenscore" data gathered from environmental impact, management, and disclosure statistics. The ranking report releases information on environmental Impact Score (a measurement of the overall environmental impact of a company's operations), Environmental Management Score (assessment of how a company manages its environmental footprint), and Environmental Disclosure Score (company's involvement in key transparency initiatives) for the fortune 500 public companies. Newsweek's Greenscore data is based on the information compiled from the two global leaders in environmental analysis, Trucost, and Sustainalytics [1] [17]. Trucost is recognized for its quantitative measurements of extensive data on corporate environmental impacts [17]. Sustainalytics is recognized for its reliable and impartial environmental analysis (Auer, 2016). The Greenscores are collected from Newsweek's "Greenscore" data and include Greenscoress for years 2011 to 2019 for Fortune 500 companies. The Greenscore is made up of three components: environmental impact (45% of the score), management (45% of the score), and disclosure (10% of the score). The score ranges from 0 to 100 and is a continuous score on the interval scale of measurement. It is expected to be normally distributed.

Profits serve as the primary outcome variable. The profit statistics were collected for the same period and evaluate the main profitability indicators. Additionally, this study employed a longitudinal study of profits for the analysis period. A longitudinal study is a type of research that does repeated observations of the same variables.

A company's greenness was measured using Newsweek's "Greenscores" [24]. Each Fortune 500 publicly-traded company is assigned a "Greenscores," grounded on three components, environmental impact, management, and disclosure. The environmental impact score (45% of the score) involves over 700 items that standardized the overall environmental impact of a company's global operations. The environmental management score (45%) assesses how a company manages its environmental footprint (i.e., its environmental policies of both its own operations and its suppliers and contractors). The environmental disclosure score (10%) evaluates how transparent the company is in its sustainability reporting and initiatives such as the Global Reporting Initiative [19]. These scores are absolute numbers, and thus, are not comparative to other companies. As a result, this measure provides a reliable method of measuring a company's greenness. Each of the sub measures may also be used in this research study to do a post hoc analysis.

One fallacy that needs to be avoided when conducting a study of this nature is to make sure that the causal pathway is going in the correct direction. That is, the cause (being green) comes before the effect (increased profits). Some companies could become greener once they have endured profitability. Thus, the two components would be correlated, but we cannot generically claim that being green leads to greater profits. For a study to indicate the causal relationship, the cause, i.e., being green, would need to come before the outcome (i.e., profitability). One approach to examining this relationship is to measure the change in Greenscores and then analyze whether these changes have improved profitability. That is, if a company's Greenscores has increased from one year to the next, we would want to see the profitability increase. However, it would require a few years for profitability to be seen as a company becomes greener. Thus, it would be significant to observe whether the change occurs quickly (the next year) or whether it takes a few years to occur.

Previous study findings emphasize environmental protection efforts to be the significant promoters of economic opportunities and corporate innovation with many advantages [16]. Additionally, these efforts focused on reducing pollution, energy consumption, and water conservation may reduce operational costs. What is more, the same study suggests that these efforts will improve employee productivity as a direct reflection of improved corporate image, greater recruitment, and retention. To determine whether different levels of being green lead to greater profits, the study applied quantitative research methods.

In the proposed research, the two quantitative research questions were examined:

RQ1. To what extent does Greenscores affect profitability at a later time point?

Q1a) To what extent do Greenscores affect profits one year later (e.g., does Greenscore in 2012 affect profits in 2013)?
Q1b) To what extent do Greenscores affect profits two years later (e.g., does Greenscore in 2012 affect profits in 2014)?
Q1c) To what extent do Greenscores affect profits three years later (e.g., does Greenscore in 2012 affect profits in 2015)?

RQ2. Does change in Greenscores affect later profitability?

Q2a) To what extent do Greenscores affect change in profits at a 1-year lag (e.g., do Greenscores in 2011 affect the change in profits from 2011 to 2012)?

Q2b) To what extent do Greenscores affect change in profits at a 2-year lag (e.g., do Greenscores in 2011 affect the change in profits from 2012 to 2013)?

Q2c) To what extent do Greenscores affect change in profits at a 3-year lag (e.g., do Greenscores in 2011 affect the change in profits from 2013 to 2014)?

The main objective of this study is to determine the correlation between Newsweek Greenscoress and a company's profit. To determine the correlation, if any, the study collected reliable data that allows for more informed decisions. Accordingly, companies with limited capital will be able to be more effective in their implementation of green strategies. Failure to develop and advance corporate sustainability initiatives may confine a company's growth and competitiveness potentials. Thus, this research would benefit companies in their decision of more useful implementation of sustainable operations and strategies.

METHOD

This study used correlational methods (i.e., correlation and regression) to see how Greenscoress in previous time periods relate to profits in later periods. Correlational studies cannot describe causation. Correlational studies allow a researcher to analyze real-world relationships when it is not possible to experiment.

One limitation with the correlational design is that it is difficult to make conclusions about the cause. If two variables are related, we do not know whether one causes others. We might have missed measuring the correct causal mechanism. It is also likely that there are multiple causes. Thus, our inferences are limited.

Another limitation with correlational studies is that although the two variables might not be correlated, we don't know which one came first. For this current study design, we get around this limitation by using a longitudinal method. Thus, we can see how the variables affect each other temporally or know which comes first in the process [18].

The sample in this quantitative study consists of profits and Greenscoress of Fortune 500 publicly traded companies. The Fortune 500 publicly traded companies were selected as their revenues are publicly available. The research data includes information on the profits and the Greenscoress of the fortune 500 publicly traded companies. The data on profits was collected from the Fortune 500 publicly traded companies as the legal obligations necessitate the detailed release of the company's profits. The profit data was verified through the companies' websites for accuracy. The Greenscores data was collected from the Newsweek "Greenscores." The purpose of this paper is to examine the relationships between Greenscoress and profits using data from Newsweek's green rankings. I have obtained the Greenscore list of companies from Newsweek's "Greenscore" rankings for 2011-2019. The ranking report releases information on environmental Impact Score (a measurement of the overall environmental impact of a company's operations), Environmental Management Score (assessment of how a company manages its environmental footprint), and Environmental Disclosure Score (company's involvement in key transparency initiatives) for the Fortune 500 public companies. Newsweek's Greenscore data is based on the information compiled from the two global leaders in environmental analysis, Trucost, and Sustainalytics [1) [17].

A company's greenness was analyzed using Newsweek's "Greenscores" for years 2011 through 2019. Each Fortune 500 publicly-traded company is assigned a "Greenscores," grounded on three components, environmental impact, management, and disclosure. The environmental impact score (45% of the score) involves over 700 items that standardized the overall environmental impact of a company's global operations. The environmental management score (45%) assesses how a company manages its environmental footprint (i.e., its environmental policies of both its own operations and its suppliers and contractors). The environmental disclosure score (10%) evaluates how transparent the company is in its sustainability reporting and initiatives such as the Global Reporting Initiative [24]. These scores are absolute numbers, and thus, are not comparative to other companies. As a result, this measure provides a reliable method of measuring the company's greenness. Each of the sub measures may also be used in this research study to do a post hoc analysis.

Profitability was used as the dependent variable of the analysis. Profitability is taken from Fortune 500 data sources for the years 2011 to 2019. Profits will serve as the primary outcome variable. The profit statistics were collected from the same year and were evaluated as the main profitability indicators. Greenness is defined as a total score compiled from the Newsweek Greenscores data for the years 2011-2019. The Greenscores are presented as the absolute numbers, which will be used as the appropriate measures of greenness.

The study utilizes cross-lagged regression to determine whether the previous Greenscore affects later company profits. Cross-lagged regression uses longitudinal data to determine how one variable affects the other over time. Lags can be changed to see whether the effect takes longer or shorter amounts of time. The lags can go in both directions so that reciprocal relationships are tested. However, the results can go in only one direction if theory dictates that relationship (Kearney, 2017). This method allows for the determination of a regression coefficient to see how much previous 'greenness' affects later profitability. It also allows for differential lags. Thus, we can see whether greenness affects profitability one year later or does it take a longer time (see below figures for illustration of different lags). Mplus [23] statistical was used to conduct the analysis. This software allows for constraining the lags to be equal across time so that one number can be provided to indicate the overall effect of a one, two, or three-year lag (alpha – represents the effect of a one year lag 1, beta – represents the effect of a two-year lag, gamma – represents the effect of a three year lag in the below Figures). One lag was used as it looks at the overall effect over time. Individual regression analyses could be conducted for each lag. However, it would be difficult to interpret four to six different numbers for each lag.

RESULTS

Table 1 indicates the descriptive data for profits and Greenscoress. The sample size indicated by the N column varies at each period. The largest sample available is in 2011 and 2012. However, the companies change on the list of most profitable companies, and the sample size changes over time as companies leave the list. The mean indicates the average of all companies for that year. The standard deviation provides information about the variability around the mean. We expect 68% of companies to have a score one standard deviation above and below the mean. For example, profits in 2011 were 3052.22 and the standard deviation is 4783.178. Thus, we expect 68% of companies to be between -1730.958 and 7835.398 (one standard deviation above the mean and one below).

Companies that are outliers can skew normal distribution. Thus, we look at skewness to make sure the data is still normally distributed. Skewness indicates whether extreme values exist in the positive or negative ends of the distribution. Large positive scores indicate skewness in the right portion of the tail (e.g., companies with extremely high profits). Large negative numbers indicate skewness in the left portion of the tail (e.g., companies with really large losses). Scores near zero indicate no skewness. For example, the Greenscore for 2011 indicates a skewness of -.177, which indicates that there is slightly more skewness in the negative tail, but this number is so close to 0 that it is not significant (below is a discussion of how to test for significance of skewness). Kurtosis gets at the flatness or how much peak a distribution has. A high number means the distribution is leptokutotic with a high peak. Low kurtosis numbers mean the distribution is platykurtotic or has a flat distribution [2]. For example, the Greenscore for 2011 indicates a kurtosis value of .608, which indicates that the distribution is slightly more leptokurtotic, but this number is so close to 0 that it is not significant A test for the significance of skewness or kurtosis is to take the value and create a confidence interval around it using the standard error multiplied by 2 and adding it and subtracting the value from it. If 0 is in this distribution, then we can say that the distribution is not significantly skewed or kurtotic.

Greenscoress are normally distributed as indicated by small skewness and kurtosis values. Profits are relatively normally distributed but have a bit of a positive skewness as some corporations have quite large profits. This slight positive skewness is not significant (plus or minus 2*Standard Error of skewness statistic still contains zero in the confidence interval), so the assumption of normality can be kept. Overall, the values in Table 1 illustrate a normal distribution for each variable with no significant skewness or kurtosis. Thus, the assumption of regression of having normally distributed variables is supported.

Table 1

Descriptive Statistics

(in thousands)	N	Mean	Std. Deviation	Skewness	Kurtosis
Profit11	499	3052.22	4783.178	2.268	10.239
Profit12	499	3262.39	6018.630	2.471	11.334
Profit13	477	3113.00	5735.834	2.723	12.700
Profit14	126	8209.68	12253.679	3.172	14.024
Profit15	499	3341.19	5542.730	3.056	16.036
Profit16	499	3341.19	5542.730	3.056	16.036
Profit17	211	3375.11	5583.245	4.173	23.926
Greenscores 2011	382	.5773	.10144	-.177	.608
Greenscores 2012	401	.5955	.10462	-.171	.351
Greenscores 2014	415	.3966	.17778	.037	-.515
Greenscores 2015	433	.4401	.19041	-.220	-.833
Greenscores 2016	409	.4490	.19095	-.065	-1.031
Greenscores 2017	387	.3710	.20604	.103	-.792

Note: Profits are reduced to thousands but are actually in millions

In Table 2, the correlations between profits and Greenscoress are illustrated. Greenscoress seem to have small correlations with profits as they range from -.096 to .209.

Table 2

Correlations

	Greenscores 2011	Greenscores 2012	Greenscores 2014	Greenscores 2015	Greenscores 2016	Greenscores 2017
Profit11	.087	.083	-.079	.052	.031	.133
Profit12	.026	-.013	-.062	.034	.010	.115
Profit13	.088	.046	-.095	-.020	-.013	.064
Profit14	.202	.204	.074	.152	.169	.209
Profit15	.189	.142	-.078	-.020	-.004	.073
Profit16	.200	.168	-.018	.011	.068	.057

Profit1 7	.105	.102	.095	-.096	-.061	.096

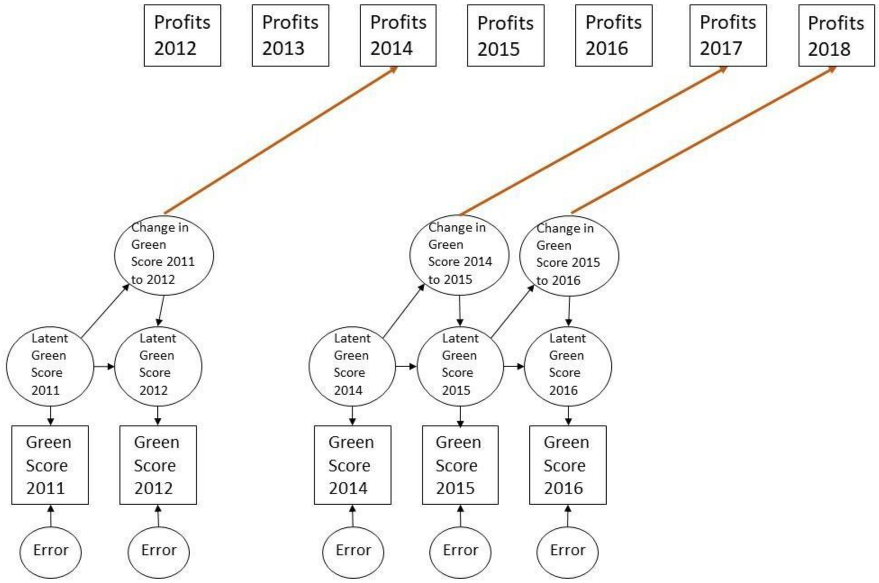
The study employed cross-lagged regression to conclude whether the previous Greenscore affects later company profits. Cross-lagged regression is a series of regressions, and it applies longitudinal data to determine how one variable affects the other over time. Lags are changed to see whether the effect takes longer or shorter amounts of time. This approach enables for the rationale of a regression coefficient to understand how much previous ‘greenness’ affects later profitability. That is, we can determine whether greenness affects profitability one year later or does it take a longer time (see below figures for illustration of different lags). A cross-lagged regression was run using Mplus 8.3 software, which allows for constraining the lags to be equal across time so that one number can be provided to indicate the overall effect of a one, two, or three-year

The regression coefficients are quite small and not significant (one year lag =.016, two year lag = .021, and three year lag = .026). Cohen [6] defined coefficients between .10 and .25 as small. As such, it does not seem that Greenscores affect profits at the one-, two-, or three-year lags. This negative finding might be because of a washing out effect of the different types of companies in the analysis. Some industries might have higher positive correlations, whereas others might have negative correlations.

To account for changes in green behavior a latent change score can be created. Bivariate Latent Difference Score modeling allows the researcher to create latent change scores [20] that overcome some of the deficiencies of other change models [8]. It allows a change score to be created that does not assume error of measurement. It allows researchers to see how one change process affects the other change process, which is an ideal way to model mechanisms of change in therapy. Interested readers are referred to McArdle and Hamagami [20] and Ferrer and McArdle [10] for the technical background. For applied uses of this model, readers can view Hawley, Ho, Zuroff, and Blatt [13] [14], Teachman et al. [28] [29].

To further explain the bivariate latent difference score model, we can break it down into three sections (although the model is estimated simultaneously). The first section at the bottom of Figure 1 creates a latent green score factor and error. By creating factors, we avoid some of the difficulties of cross-lagged regression (i.e., assuming perfectly measured variables) as the variance is split into error and a “pure” construct. Moving from the bottom of the model upwards, the next section of the model is to create the change in green behaviors from one year to the next. The change score is then used to predict profits one year later. To further clarify, the latent change variable created from GreenScores from Time 1 to Time 2 predicts profit one year later. We set the change parameters to be equal as we did not hypothesize that change would be greater or less over time.

Figure 1. Latent Change Score Model of Green Score Predicting Profits 1 Year Later



Results from the latent change score models indicate that change in green behaviors significantly predict profits 1, 2, and 3 years later (.16, .17, .22). These findings are in stark contrast to the findings that the absolute level of green behavior did not predict profits. Rather, it is the change in green behaviors that predict profits.

DISCUSSION

The purpose of this quantitative study was to determine the extent to which Greenscores affect profitability. Profits were used as the outcome and green behavior and change in green behavior were used as predictors. Specifically, the study examined the relationship between Newsweek Greenscores and total profits at lags of 1 year, 2 years, or 3 years. The study utilized Greenscores and profitability for the years 2011 to 2019.

We found no significant relationship between green behavior and profits at 1, 2, and 3 year time lags. However, change in green behavior seems that change in greenness might be more important than the overall level of greenness. That is, companies that changed more in their greenness had significantly greater profits a year, two, and three years later.

Corporate environmental responsibility has become a significant subject among researchers and practitioners when it comes to profitability and environmental protection. The presented literature suggests a growing concern among the government, business community, and overall society for environmental protection. Environmental protection is essential for both corporate and social growth, as there is alarming evidence of long-term environmental damage [21]. In addition to the urgency of environmental safeguarding as a means of preserving corporate and social well-being, several studies indicate that greener companies may benefit from the increase in their corporate sustainability efforts. From the review of the existing literature, several benefits of corporate sustainability and environmental protection arise into consideration. Environmental and social consciousness are the responsibilities of corporations to the society, community, and environment that can benefit the companies consequently. Moreover, the extended literature recognizes several advantages of corporate environmental consciousness, including competitiveness, cost reduction, economic value, economic performance, environmental management, corporate social responsibility, corporate environmental production, and sustainability investment effect. Moreover, these studies illustrate a positive relationship of the customers with the company, and customer loyalty and brand trustworthiness. Thus, the prevalent view is that corporate sustainability efforts will result in greater profits and long-term growth. Consequently, it does not seem that the absolute level of greenscoress affects profit.

Even though the literature reviewed reveals that corporate environmental consciousness has several economic benefits, this study has not found a significant relationship between the Greenscoress and total profits. Thus, the correlations between Greenscores and profits are small, and profits might not be the best outcome measurement for companies' 'greenness.' Many factors play a role in profits, and this outcome might not be sensitive enough. There might be some potential reasons for these small effects. For instance, the initial costs of implementing environmentally conscious processes require considerable amounts of capital for new equipment and other infrastructure. These initial costs could take companies a substantial amount of time to recover. Therefore, the different characteristics and timing of environmentally conscious activities in which the company operates is a variable that controls the relationship between Greenscores and profitability. Some environmentally friendly initiatives could take a few years to capitalize. However, based change in green behaviors did seem to have some effect on profits. It might be the change in the amount that is more important than the absolute level. It might be that there is a strong positive relationship between Greenscoress and profits in some sectors and an insignificant correlation in other sectors. Because this study did not focus on a specific sector, it is recommended that this focus could be due in future research.

The study has limitations that might have restricted this study's capability to determine changes in a company's profitability. The research relied exclusively on corporate annual reports and Newsweek Greenscores reports as sources of information. This approach uses only profits as the main outcome.

To better understand the relationship of Greenscores and profit, and because the study primarily focused just on the Greenscores and its linkage to profit, it is recommended that further study be conducted to determine when combined with other factors, the true impact of Greenscores on a company's profit if any. The bearing of companies' debt ratio as a profitability constraint should be considered. Specifically, a degree of debt associated with the implementation of sustainability and greener processes might influence companies' cash flow and profit outcomes, thus, resulting in investment decision constraints. According to Banerjee and Kaya [3], the effects of the company's characteristics during development procedures conditions on different measures of company profitability. That is, the management decisions as a result of the debt ratio might impact lower profit margins and returns on equity for the company. Furthermore, high-leverage companies during development periods could be increasing the borrowing needed to fund the implementation of the greener processes. Additionally, different drivers and antecedents' measures, such as profitability ratios and return on assets (ROA), and return on equity (ROE), could be used to analyze whether there is a significant impact of greener processes on profitability. ROA ratio indicates the profitability of asset utilization. ROE measures profitability in relation to equity and indicates how well a company uses investments to generate earnings. This would allow for a better understanding of the profitability relating to corporate sustainability efforts. Additionally, analysis of the net cash supplied by operating activities in the statement of cash flows could offer valuable input on the companies' operational effectiveness. The variety of financial measures suggests that the relationship between green processes and profitability is nonlinear and depends on lots of factors; thus, future studies should examine specific activities with different financial ratios.

Lag over a longer period of time could be examined to determine whether there is a significant relationship between the Greenscores and companies' annual profits. The data collected for this study was from 2011 to 2017, thus, potentially affecting the level of findings due to time constraints. According to Kim, Bansal, and Haugh [15], sustainability research should entail a broader measurement of company performance by integrating time-based information, as sustainability investments are likely to have a longer time lag that signifies time-based information on company's profitability. Therefore, future research should analyze data that covers a longer period of time.

Another aspect of measure to consider is the type of industry where companies' greenness scores would be highly influenced by the type of product being produced. For instance, a company like Apple might appear greener than a company such as Chevron due to the industry in which these two companies belong, as well as their many operational differences. That is, the industry diversity, as well as size play, are strong factors in the profitability outcomes when evaluated against Greenscores, and as such, future research should consider these variances.

Thus, future research may include some of the above discussed mediating metrics as they explore various avenues of corporate progress toward sustainable development, ultimately inspiring new sustainability research and practice concepts. Translating sustainability metrics into profitability and greener performance outcomes are complex and must be cautiously and properly facilitated. This research provides a framework towards the continued commitment of analyzing the relationship between corporate environmental consciousness and profitability.

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HOW A SMALL FAMILY BUSINESS ENTERED A NEW MARKET IN COMPLIANCE WITH FEDERAL GOVERNMENT POLICY

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ABSTRACT

This case is at the intersection of small business Marketing Strategy, Business Ethics, and Compliance with Federal Policy. It covers a small family business founded in 1984, Mid-Atlantic Drainage, which grew into a leading manufacturer and distributor of drainage products in South Carolina. Company vision meant a move to expand from South Carolina into North Carolina. The goal was to participate in the business of Federal Highway (FHWA) expansion and repair. To make that move, the North Carolina Department of Transportation followed Federal Rules that required Mid-Atlantic-Drainage to have all employees attend an ethics training program. This case is designed to show how having employees trained in small business ethics can be a valuable tool for new market entry.

INTRODUCTION

Michael Porter (1980) identified the six barriers to entering new markets profitably. These include:

1. Cost advantages of incumbents
2. Product differentiation of incumbents
3. Capital requirements
4. Customer switching costs
5. Access to distribution channels
6. Government policy

In a study of industrial goods markets, Karakaya and Stahl (1989) included government policy in a research project on barriers to market entry. Government policy was found to be a critical barrier for industrial goods markets similar to Federal Highway construction markets. Cantor (1989) did a survey of small businesses to describe barriers to selling goods and services to the U. S. government. The participating businesses reported that federal government projects had higher costs in making proposals and producing goods making less profit from revenues. In another study of small businesses (Castle, 1972), has shown environmental control as a major challenge to small businesses and uses the example of 'A temporary dam to strengthen a roadway may spoil a fishing stream for as much as an entire season.' The Government Policy issue became very relevant to Mid-Atlantic Drainage, Inc. and the planned entry to North Carolina.

THE PROBLEM

The problem was, the North Carolina Department of Transportation Materials & Tests Unit required all employees of Mid-Atlantic Drainage to complete an ethics training program. This Federal requirement followed many ethical lapses of contractions for the Federal High Way Administration (FHWA). FHWA oversees road projects involving Federal Government funds to ensure that federal requirements for project eligibility, contract administration and construction standards are adhered to. Ethical lapses in highway construction projects create major financial and physical disasters leading to loss of life.

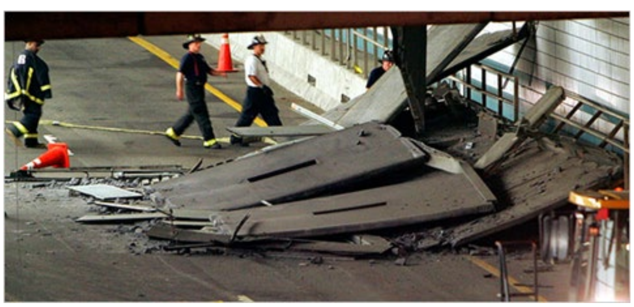
TWO EXAMPLES OF ETHICS LAPSSES AND THEIR CONSEQUENCES

FIGURE 1 BOSTON'S BIG DIG

Ethical lapses in Boston's Big Dig led to a ceiling panel falling on a car traveling on the two-lane ramp connecting northbound I-93 to eastbound I-90 in South Boston, killing a passenger and injuring the driver. Investigation and repair of the collapse caused a section of the Big Dig project to be closed for almost a full year, causing chronic traffic backups (Boston Tunnel Design Faulted in Collapse By: The Associated Press, AP Online, 11/01/2006.)

FIGURE 2: IMAGE OF DESTRUCTION

An image of the destruction is below:



MODERN CONTINENTAL CONSTRUCTION

One of the main contractors for the Big Dig was Modern Continental Construction. This company engaged in a number of unethical practices including those listed below. (McNichol, Dan. (2008). Roads & Bridges Special Report, February, 22-26).

- Unauthorized Time Cards: Modern Continental Construction committed fraud when it misrepresented employee labor, by overcharging for more work hours in order to increase profit.

- Time overcharging: Modern Continental Construction misrepresented the distribution of employee labor on jobs in order to charge for either more work hours, or a higher overhead rate, to increase profit.
- Overbilling: Modern Continental Construction admitted it overbilled the project by $167,000 over 15 years by claiming pay for workers classified as experienced journeymen, when they were in fact apprentices.
- Time Overcharging: In a time-overcharging scheme, Modern Continental misrepresented the distribution of employee labor on jobs in order to charge for either more work hours, or a higher overhead rate, to increase profit. Modern Continental Construction admitted it overbilled the project by $167,000 over 15 years by claiming pay for workers classified as experienced journeymen, when they were in fact apprentices.
- Materials Overcharging: Modern Continental Construction also misrepresented how much construction material was used on the job as well as the quality of the material used and was paid for excess material and non-existent quality to increase job profit.
- Quality-Control Testing Fraud: Modern Continental Construction also misrepresented how much construction material was used on the job as well as the quality of the material used and was paid for excess material and non-existent quality to increase job profit.

CONSEQUINCES FOR MODERN CONTINENTAL CONSTRUCTION

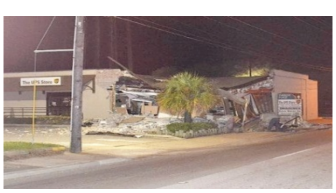
As a consequence of unethical behavior, Modern Continental Construction faced criminal fines of up to $500,000 on each of the 39 counts to which it pleaded guilty, or about $20 million.
The company sought the shelter of the US Bankruptcy Court three days after it was criminally charged pleading the company has no money to pay fines. (McNichol, Dan. (2008). *Roads & Bridges Special Report*, July, 16-17).

A DISASTER CLOSER TO MID-ATLANTIC'S HOME

The owners of a UPS Store and three commercial buildings in Georgetown, SC filed a lawsuit this week against the South Carolina Department of Transportation and a trio of contractors, claiming that negligence during a city drainage project caused a sinkhole that destroyed their properties

At about 11 p.m. on Nov. 17, 2011, part of the Parrish Place building at 202 N. Fraser Street collapsed onto the UPS Store located on the west side of the building. The owners have since demolished the rest of that building and sued for damages. (Property owners file lawsuit over Georgetown sinkhole, The Sun News Friday, Jan. 18, 2013).
See the image of the destroyed UPS Store below.

FIGURE 3: IMAGE OF DESTROYED UPS STORE



(Scott Harper, Georgetown Times, Published Friday, January 18, 2013 4:36 AM)

THE SOLUTION

The Mid-Atlantic Drainage business manager knew ethics training was something a consultant could do. He was familiar with Coastal Carolina University, and called the Business College Dean's office looking for assistance. As a consequence, a Business Ethics Training Program was created and conducted by the Associate Dean. The training was conducted at company offices in Aynor, SC. The training program included the following elements:

- Definition and Scope of Business Ethics
- Employees Involvement in Business Ethics
- Corporate Social Responsibility
- How does Business Ethics pay?
- Business Ethics Principles
- Wrap-up and Discussion of Issues

The training program involved 22 active participants who personally signed an attendance sheet. Each participant was provided a folder with all training materials for use after the session ended.

Company ethics has been called one of the most difficult things to measure and study (Payne, 1980). Sparks and Hunt (1998) identified the concept of ethical sensitivity, meaning the ability to identify an ethical issue is the first step in ethical decisions. The approach in this training was to administer two short questionnaires concerning Business Actions and Corporate Ethics after training was completed. Both instruments can be found in complete form in the Appendix. The goal was to assess ethical thinking and behaviors for employees.

ASSESSING EMPLOYEE ETHICS

The first exercise to assess employee ethics was the Corporate Corruption Scale. This scale was based on a corporate ethical values scale developed by Racelis (2010).

Corporate Corruption Scale

Directions were as follows:
Please read the business actions below and indicate whether or not some employees at Mid-Atlantic Drainage have done these things in the past, are doing them now, or that employees at Mid-Atlantic Drainage are willing to do these things in the future.
You may circle one, two, three or none of the numbers for any Business Action.
1 = Done in the past   2 = Doing now   3 = Will do in the future
Of the 22 employees answering the questions, the number of answers given for each question is presented in tables below. Large frequency answer categories mean more employees gave an answer to that question indicating that action had been done in the past, is being done now, and/or will be done in the future.

Results for the Corporate Corruption Scale

Directions for the Corporate Corruption Scale were as follows:
Please read the business actions below and indicate whether or not some employees at Mid-Atlantic Drainage have done these things in the past, are doing them now, or that employees at Mid-Atlantic Drainage are willing to do these things in the future.
You may circle one, two, three or none of the numbers for any Business Action.

The numbers indicate the following: 1 = Done this in the past, 2 = Doing this now, and 3 = Will do this in the future.

Of the 22 employees answering the questions, the number of answers given for each question is presented in tables below. Large frequency answer categories mean more employees gave an answer to that question indicating that action had been done in the past, is being done now, and/or will be done in the future.

In the first table, those marked in bold type indicate things the company may want to pay attention to due to liability concerns.

Of the 23 items, "Dumping toxic waste." is the most frequently cited action getting 20 marks and is very relevant for the anticipated business expansion and ongoing operations.

TABLE 1: At Least One Employee Answered These Corrupt Actions Were Taken

Done this in the past	Doing this now	Will do this in the future	Business Action
2			Accepting "gifts" from Clients
5	1	1	Bribing kids with toys or candy
1	1		Cheating on taxes
2	1		Defaulting on loans
7	**9**	**4**	**Dumping toxic waste**
4	2	1	Hiding Income from a wife or husband
3		1	Steering business to friends or family

TABLE 2: No Employee Answered These Corrupt Actions Were Taken at any Time

Bribing people in restaurants	Lying on a résumé	Rolling back odometer on truck or car
Buying prescription drugs from other people	Lying to the boss	Selling company materials
Contributing illegally to politicians	Fixing prices	Shoplifting
Dealing drugs	Padding expense reports	Smuggling cigarettes
Insider trading	Pretending to be hurt when not hurt	Stealing Internet access
		Requiring sales personnel to give up money in proportion to the merchandise purchased from them

Corporate Ethics Scale

The Corporate Ethics Scale was adapted from a scale of unethical behavior developed by Kaptein (2008). Directions for the Corporate Ethics Scale were as follows:
Please circle the number below each statement that best describes your opinion concerning the statement. Please do not leave any unanswered. Numbers on the left mean you disagree, those on the right mean you agree, and 6 means you have no opinion.

Results for the Corporate Ethics Scale

The results of the Corporate Ethics Scale are summarized for each item here and complete distributions of responses are available in the Appendix.

Item 1: Employees at Mid-Atlantic Drainage often do things that I consider unethical.
The results for the first item show Strongly Disagree with 9 responses and Neither Agree Or Disagree with 6 responses accounting for 15 of 22 responses. Interpreting the results of the Corporate Ethics Survey was done by looking at the extreme 'Strongly' anchors and the 'Neither' middle-ground category for each item. In general, employees do not see a great deal of unethical behavior at Mid-Atlantic Drainage.

Item 2: In order to succeed at Mid-Atlantic Drainage, it is necessary to be unethical.
The results for the second item show Strongly Disagree with 9 responses and Neither Agree Or Disagree with 3 responses accounting for 21 of 22 responses. In general, employees do not feel it's necessary to be unethical to succeed at Mid-Atlantic Drainage.

Item 3: Top management at Mid-Atlantic Drainage has told everyone that unethical behaviors will not be tolerated. Results for the third item show strong support for top management telling employees that unethical behaviors will not be tolerated. In fact, 17 employees were agreeing with the statement made in Item 3 and only 1 strongly disagreed, which may be a mistaken response of an employee who did not attend to the valence of the question.
Item 4: If I was caught doing unethical things that result in benefiting me, rather than Mid-Atlantic Drainage, I would be promptly reprimanded.
Results for the fourth item showed polarized responses with 6 strongly disagreeing, 7 strongly agreeing, and 6 neither agreeing or disagreeing with the proposition.

Item 5: If I was caught doing unethical things that result in benefiting Mid-Atlantic Drainage, rather than me, I would be promptly reprimanded.
Of the 22 responses to Item 5, 12 were 'Neither Disagree Or Agree' and 5 were Strongly Agree. This response pattern may indicate employees are unsure of the consequences of benefiting Mid-Atlantic Drainage with unethical behavior.

CONCLUSIONS AND IMPLICATIONS

BUSINESS ACTIONS SURVEY

In the first table from this survey, those marked in RED indicate things the company may want to pay attention to due to liability concerns. Of the 23 items, "Dumping toxic waste." is the only frequently cited action. Among the other items, 16 were not cited by anyone and five citations was the highest number of citations for the remaining items. These items are not directly related to company operations and were not cited most likely due to being irrelevant indicating good validity to the one key issue cited.

APPENDIX

Complete Corporate Ethics Survey Results

There were five items on the Corporate Ethics Survey. The survey items started with an ethics statement followed by the employee checking a box with anchors from 1 Strongly Agree, to 6 Neither Agree Or Disagree, and 11 Strongly Agree the results for each item are below.

Item 1: Employees at Mid-Atlantic Drainage often do things that I consider unethical.

Answer	Frequency
1 Strongly Disagree	9
2	1
3	1
4	0
5	0
6 Neither Agree Or Disagree	6
7	1
8	1
9	1
10	0
11 Strongly Agree	2
Total	22

Item 2: In order to succeed at Mid-Atlantic Drainage, it is necessary to be unethical.

Answer	Frequency
1 Strongly Disagree	18
2	0
3	0
4	0
5	0
6 Neither Agree Or Disagree	3
7	1
8	0
9	0
10	0
Strongly Agree	0
Total	22

Item 3: Top management at Mid-Atlantic Drainage has told everyone that unethical behaviors will not be tolerated.

Answer	Frequency
1 Strongly Disagree	1
2	0
3	0
4	0

5	0
6 Neither Agree Or Disagree	4
7	2
8	1
9	1
10	3
Strongly Agree	10
Total	22

Item 4: If I was caught doing unethical things that result in benefiting me, rather than Mid-Atlantic Drainage, I would be promptly reprimanded.

Answer	Frequency
1 Strongly Disagree	6
2	0
3	0
4	0
5	0
6 Neither Agree Or Disagree	6
7	0
8	0
9	3
10	0
Strongly Agree	7
Total	22

Item 5: If I was caught doing unethical things that result in benefiting Mid-Atlantic Drainage, rather than me, I would be promptly reprimanded.

Answer	Frequency
1 Strongly Disagree	1
2	1
3	0
4	0
5	0
6 Neither Agree Or Disagree	12
7	1
8	0
9	2
10	0
Strongly Agree	5
Total	22

DO NOT PUT YOUR NAME ON THIS PAPER
Business Actions Survey

Please read the business actions below and indicate whether or not some employees at Mid-Atlantic Drainage have done these things in the past, are doing them now, or that employees at Mid-Atlantic Drainage are willing to do these things in the future.

You may circle one, two, three or none of the numbers for any Business Action.

1 = Done in the past 2 = Doing now 3 = Will do in the future

Circle Number(s) Below			
Done this in the past	Doing this now	Will do this in the future	Business Action
			Bribing people in restaurants
			Buying prescription drugs from other people
			Contributing illegally to politicians
			Dealing drugs
			Fixing prices
			Insider trading
			Lying on résumé
			Lying to the boss
			Padding expense reports
			Pretending to be hurt when not
			Rolling back odometer on truck or car
			Selling company materials
			Shoplifting
			Smuggling cigarettes
			Stealing Internet access
			Requiring sales personnel to give up money in proportion to the merchandise purchased from them

CORPORATE ETHICS SCALE DO NOT PUT YOUR NAME ON THIS PAPER

Please circle the number below each statement that best describes your opinion concerning the statement. Please do not leave any unanswered.

1. Managers in my company often engage in behaviors that I consider to be unethical.

Strongly Disagree					Neither Agree Nor Disagree					Strongly Agree
1	2	3	4	5	6	7	8	9	10	11

2. In order to succeed in my company, it is necessary to compromise one's ethics.

Strongly Disagree					Neither Agree Nor Disagree					Strongly Agree
1	2	3	4	5	6	7	8	9	10	11

3. Top management in my company has let it be known in no uncertain terms that unethical behaviors will not be tolerated.

Strongly Disagree					Neither Agree Nor Disagree					Strongly Agree
1	2	3	4	5	6	7	8	9	10	11

4. If a manager in my company is discovered to have engaged in unethical behavior that results primarily in personal gain (rather than corporate gain), he or she will be promptly reprimanded.

Strongly Disagree					Neither Agree Nor Disagree					Strongly Agree
1	2	3	4	5	6	7	8	9	10	11

5. If a manager in my company is discovered to have engaged in unethical behavior that results primarily in corporate gain (rather than personal gain), he or she will be promptly reprimanded.

Strongly Disagree					Neither Agree Nor Disagree					Strongly Agree
1	2	3	4	5	6	7	8	9	10	11

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IMPLEMENTING A STUDENT-MANAGED CRYPTOASSET FUND IN FINANCE CURRICULUM

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ABSTRACT

In 2004, Roanoke College began offering a Student-Managed Fund course, wherein students were able to manage a portfolio of equity and fixed income using real money. This was a somewhat new concept at the time and has since become standard practice for finance programs, either through courses or clubs. In February 2019, we supplemented our activities in this course with the addition of real cryptoassets for the students to manage. It is certainly one of the first, and to the author's knowledge may be the only, real money cryptoasset fund managed by students. This paper discusses the implementation of this fund as well as its pedagogical advantages.

INTRODUCTION

The use of real-money funds left to the control of undergraduate students is now widely accepted and implemented. Neely and Cooley (2004) document 22 student-managed funds (SMFs) in place as of 1988, which grew to 128 SMFs they were able to identify in 2003. Currently, there are 111 institutions with funds that are members of the Student Managed Investment Fund Consortium (SMIFC) and 474 non-member institutions with SMFs in place, for a total of nearly 600 of these programs in the U.S alone[1]. The corresponding literature on the development, design, and implementation of such programs has grown dramatically as well[2].

Further, the literature regarding the pedagogical value of experiential learning programs is well established and is being expanded to include SMFs in particular[3]. Importantly, the pedagogical value of these funds is not restricted solely to economic or financial skills. Clinebell and Murphy (2016) find that surveyed alumni feel that their experience in a SMF improved not only their understanding of investment concepts, but also many soft skills such as communication, leadership, and interpersonal skills. Such skills are highly valued by employers regardless of whether a graduate chooses to pursue a career in the financial sector.

While most SMFs started trading typical U.S. equity and fixed income positions, usually with a variety of constraints, many have since expanded to allow trading in alternative investments such as international positions, options, or commodities[4]. The value of such expansions is clear, as this allows students to gain

[1] Indiana State University, Scott College of Business. "List of SMIFs" https://www.indstate.edu/business/SMIFC/research/lists Retrieved Sep. 12, 2021
[2] See, for example, Adams and Belcher (2013), Ammermann et al. (2011), Block and French (1991), Bruce and Greene (2013), Cooley and Hubbard (2012), Dolan and Stevens (2010), Macy (2010), and Saunders (2008)
[3] See, for example, Becker and Watts (2001), Clinebell and Murphy (2016), Dewey (1938), Gagnon and Witt-Smith (2001), Kolb and Kolb (2005), and Simpson (1997).
[4] See, for example, Ascioglu and Maloney (2020), Hughen and Lung (2018), and Saunders (2014)

practical experience in a wider range of securities. However, I have yet to find any evidence of another institution implementing real cryptoasset trading in their SMF program. This is understandable, as this asset class itself is new, with Bitcoin's launch in 2009, and institutional accounts for this type of trading only became available in late 2018. Thus, it seemed wise to document the integration of this fund into our existing SMF structure as well as its educational value.

Given that this fund was incorporated into an existing SMF program, I will first briefly describe this program at Roanoke College for clarity. Thereafter, I will discuss cryptoassets generally, followed by the implementation of the student-managed crypto fund (SMCF) and its pedagogical advantages. Lastly, I will discuss the complications associated with having students manage this fund and with these types of accounts more generally.

BACKGROUND

The Student-Managed Fund at Roanoke College was founded in 2004 and is offered as a course worth a half unit[5] that can be repeated up to four times. This original portfolio was initially highly restrictive, requiring an equity target of 65%, all of which must have been invested in S&P500 companies, and the remaining 35% would be in fixed-income or cash. Over time, the permitted trades were expanded, allowing for small positions in U.S. non-S&P500 positions, international equity and fixed income positions, and covered calls. The primary goal of our fund is to analyze investment alternatives, while staying within the bounds of an investment policy statement (IPS) and considering the impacts of decisions on a portfolio as a whole. While the professor for the course serves as a resource and guide, students are responsible for discussing changes they want to make in the fund's strategy and the class is run by a student Fund Manager and Assistant Fund Manager. Students are divided into sector assignments[6] with at least one "Senior Analyst" (2nd semester or later student) in each sector to employ a form of mentorship. Sector reports are given once per week to discuss our positions, alternatives, and the sectors as a whole. Trade decisions are made by majority vote and the professor has no vote or veto unless the trade falls outside the IPS. While we track our performance against a benchmark portfolio[7], and have slightly outperformed it since the fund's inception, our primary concerns are to ensure high-quality discussions and analysis, to maintain consistency from discussed goals and expectations to trade decisions, and to improve students' soft skills.

CRYPTOASSETS

A brief explanation of cryptoassets themselves is necessary to discuss the benefits and risks of incorporating their inclusion in SMFs. Cryptoassets are very commonly given the misnomer "cryptocurrencies." This can be forgiven since the first viable, and still largest, cryptoasset (Bitcoin) was developed with the intention of providing an alternative to government-backed currencies. However, it is a misnomer nonetheless, as most cryptoassets were never intended to serve as transactional currencies and do not possess the necessary features to do so. Instead, these assets are created as a means to employ new

[5] For comparison, most of our courses are considered 1 "unit", the hours for which are equivalent to 4 credits.
[6] We find it best to assign sector pairs, both to increase collaboration and to ensure engagement without ignoring less-active sectors. Our pairs are: (1) Health Care and Materials, (2) Consumer Staples and International, (3) Information Technology and Utilities, (4) Consumer Discretionary and Fixed Income, (5) Financials and Real Estate, (6) Industrials and Energy, and (7) Communication Services and Cryptoassets.
[7] 65% S&P500 and 35% Bloomberg US Aggregate Bond Index

technologies - namely “blockchains,” “distributed ledgers,” and “smart contracts” - to improve inefficiencies in financial markets by decreasing costs, increasing speeds, or otherwise improving the settlement of financial transactions[8]. While these may not seem it, the range of functions these tokens can serve is vast. Some do act similar to currencies, while others are more akin to equities. Others still may be more like utilities, or commodities, or have no existing parallel.

A good place to start would be Bitcoin[9]. The Bitcoin protocol can be thought of as similar to the internet protocol. The internet protocol allowed for the transmission of packets of information. It was developed in the 1970’s, going through a variety of iterations, and was largely useless for the better part of two decades. This was because there wasn’t much in the way of electronic information to transfer and using it required expensive equipment plus technological expertise. However, over time, as the new technology was adopted, more electronic information was created. More importantly, applications were developed (like web browsers, instant messengers, email, etc.) to decrease the expertise required to interact with this new technology, and to vastly expand its uses.

The Bitcoin protocol allows for the public tracking of transactions on an immutable ledger, thus eliminating the need for third-party financial institutions to oversee them. As transactions are processed, they are added to a “block,” which is then verified by any member of the public that wishes to run the protocol. This verification process is what is called “mining” and those engaged in it are rewarded with some of the underlying token, in this case Bitcoin (BTC). All “nodes” running this protocol maintain a copy of the entire history of all blocks, the “blockchain.” This prevents any one node from changing the blockchain erroneously, as all other nodes will have the true set of blocks and will override the bad actor[10]. Much like the internet protocol, when Bitcoin was first created, very few people used it because it wasn’t trusted and the infrastructure and applications to interact with it didn’t exist yet. Today, many of the new cryptoassets are actually applications that run on the Bitcoin (or a competitor’s) blockchain with the intention of making it easier to interact with; however, as of the time of writing, most are either attempting to improve the general infrastructure of how the technology is used or to replace the current large tokens with an alternative that they believe is better in some manner. For example, Polkadot (DOT) is intended to allow otherwise unrelated blockchains (like Bitcoin and Ethereum) to securely communicate with each other so that data can be easily transferred between them. Alternatively, Solana (SOL) was developed specifically to try to compete with Etherium (ETH) to become the go-to platform for running applications. Between these improvements to infrastructure and the corresponding introduction of more sophisticated (and safer) exchanges, individuals with little technical expertise are now able to invest in these assets with little effort. Hopefully they do so understanding that they are, primarily, speculating on the extent to which that asset will be adopted to serve its intended purpose or on the adoption of cryptoassets generally.

[8] Even this summary is overly generalized, as some cryptoassets serve other functions unrelated to financial transactions, while others may serve no function at all. As in any new market, imposters abound and both caution and due diligence are encouraged.
[9] Note the capitalization. It has become more common in industry to capitalize the underlying protocol or the currency as a whole, while using a lower-case when referring to a count of the token. For example, the Bitcoin protocol is the underlying technology that people are supporting when they buy bitcoins.
[10] Indeed, even if a group of bad actors were able to take control of a massive proportion of the computing power for the network, it would still likely be prohibitively expensive to make any false adjustments, particularly given that, if they were successful, the network would quickly lose the public trust and become worthless.

While some finance practitioners have examined these assets to some extent[11], the financial literature on this topic is sparse[12]. Suffice it to say that valuations of these assets are highly volatile and are in some manner related to (1) the expected adoption rate of cryptoassets generally, (2) the intersection between the value of aggregated uses for a particular asset and its expected adoption rate, and (3) the impact of technical factors due to the lack of a solid framework for fundamental valuation.

INCORPORATION OF CRYPTOASSET ACCOUNT TO OUR SMF

When institutional accounts were being launched in late-2018, one of our alumni approached us with the desire to start a fund where our students could try trading real cryptoassets. The institutional account was opened with Coinbase[13] in early 2019 and $50,000 worth of bitcoin (BTC) was donated over the course of the year at an average price of about $5,000 each, resulting in an account with just over 10 BTC. For the first semester, this was included in the course as an optional open discussion at the end of class that anyone who was interested could participate in. Unfortunately, engagement was low. While this seemed concerning, upon further digging, I discovered that many students had heard of crypto before, and were curious about it, but didn't feel they knew enough about it to start trading. As a result, I changed two major aspects of the implementation. First, I added a mini-lecture (about 45 minutes plus Q&A) to the beginning of the semester talking specifically about cryptoassets to ensure that everyone had at least a base-level understanding of this new asset class. Second, I added it as a sector to be assigned, just likeour equity sectors, so at least a few students (usually those with the most interest) would do more extensive research, which they would then bring back to the rest of the class to discuss in their sector reports. This format has resulted in much higher engagement levels.

Once engagement was strong and students had a better foundation, a new problem arose – the majority of news about cryptoassets is baseless speculation ("hype") or based on technical indicators. While many sources are beginning to generate more sophisticated analyses, there is undeniably more speculation than for more developed markets. As a result, students tended to propose trades with little justification. Worse, the potential for students to easily drift toward day trading due to volatile shifts in these markets was apparent. Thus, substantial emphasis is needed at the beginning of, and throughout, the semester to ensure that our analysts examine what, exactly, a particular asset was designed to do and why it is likely better than the alternatives in the long run. Interestingly, I find that this focus on longer-term thinking may actually be helping students build more resilience to dramatic shifts in the market. While a 15% correction on the S&P500 typically spooks inexperienced investors, I get the impression that this may be lessened after observing the much more volatile swings in crypto markets. Thus, students may be better able to see corrections as buying opportunities and they may focus more on the long-term viability of a position, rather than shorter-term fluctuations.

On the other hand, I have also seen that students may be too risk-averse due to the large shifts in this market, sometimes proposing trades on less than 1% of the portfolio value. Ultimately, a cryptoasset fund requires more oversight, guidance, and control from the instructor. Indeed, unlike for our SMF, for the

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[11] See, for example, Burniske and Tatar (2018)
[12] See Kim et al. (2018), for example. This is a solid starting point, though it still barely breaks the surface of all there is to understand.
[13] Binance was the only alternative at the time and our decision was based off of the promised features forthcoming (some of which have yet to be implemented on either platform), as well as the range of assets offered initially as well as planned additions. Other exchanges now exist and I offer no recommendation for an institutional platform because they are all constantly updating their services offered.

SMCF the professor can change the terms of a trade pitch or veto a trade altogether. While I've rarely found the need to use this, there are a few reasons for it. For instance, when a pitch was made to buy a new position for less than 1% of the portfolio value, I adjusted the trade vote to be worth 3% on the argument that if we didn't want to take a position of 3%, even for a riskier token, in a portfolio of only 7 assets, then we probably just aren't confident enough to justify taking the position at all. Transaction fees are also quite high, so high-volume trading would need to be prevented if attempted, though I haven't encountered this in our format. I imagine as the market matures these safeguards may be eased.

By incorporating these discussions into our typical sector reports, students are receiving a more consistent stream of exposure to this content, thus improving familiarity, confidence, and interest. I have found that students in each semester thus far have improved the sophistication of their analyses as they become more comfortable with these assets and as new junior analysts have access to senior analysts with more experience. Further, these discussions are beginning to connect crypto to typical equity sectors, like information technology or financials, as students see how their performance may be related.

PEDAGOGICAL ADVANTAGES

While the obvious benefit of providing exposure to a new asset class is important in its own right, there are many other benefits that stem from the inclusion of the SMCF into our SMF structure. Students' independent research skills improve due to the need to dig through the noise in order to find meaningful information. Moreover, this is typically an area to which students have had very little exposure and the differences between alternatives are not immediately intuitive. Thus, students must familiarize themselves with a brand-new market that acts very little like those they are used to. Clearly, then, this also leads to an improvement in critical thinking skills, as students must apply their existing knowledge and experience to a similar but distinct new challenge. Even better, they must do so with real money and real consequences, encouraging a level of rigor that would almost undoubtedly be absent in a simulation of such a volatile market.

Further, the finance industry has begun incorporating these new technologies into their own operations in order to avoid losing market share. This experience will allow students to show employers that they have already had some exposure to crypto, which may make them more versatile as these technologies become more pervasive. Lastly, few alternatives will highlight the importance of risk management more than overseeing an asset class where individual positions can fluctuate more than 20% in a single day. Not only does this focus attention on the importance of understanding the impacts of risk, both on the short- and long-term scale, but it also helps students develop resilience in the face of uncertainty. Making decisions with weak or confusing information is difficult, but it is an important skill to develop. Similarly, knowing when you should make a decision based on your best information and when you should refrain is equally valuable. Encountering these situations before entering the workforce is likely to result in more mature and proactive decision-making.

COMPLICATIONS TO CONSIDER

While it is probably already apparent that the implementation of this fund was not without its hiccoughs, I present a more direct summary of the complications we encountered, as well as the risks that will persist, to assist others in preparing such a fund for their own SMF programs. Most complications that may arise, though not all, can be addressed either in advance to preempt the issue or by developing a plan for contingent interventions should the need arise.

Interest Level: It is crucial that at least one highly interested, and highly proactive, student is assigned to the cryptoassets sector. While this may not be a problem for larger programs, those with fewer participants may wish to consider how this would be handled. One option may be to allow the instructor or some combination of instructors and/or administrators to manage the fund, likely mostly passively, when no students are focusing on this area. Alternatively, such an overseer could be urged. For example, our plan, should interest in this sector be weak, is to add our Fund Manager or Assistant Fund Manager, who normally focus on the whole portfolio rather than a particular sector pair, to the group covering crypto, as they are already among the most engaged and enthusiastic in the course. While we haven't had the need to do this yet, some managers still interact with the crypto sector group extensively anyway simply due to their curiosity. Indeed, this interaction should likely be encouraged regardless.

Risk Management: The nature of trading cryptoassets is highly volatile. This can result in both excessive risk aversion and excessive risk taking, thus fear and irrational exuberance must be managed. Generally, standard oversight should be sufficient to reign in conversations back to a middle ground if they start moving toward one of these extremes and emphasis on this point early in a semester can minimize such deviations in advance. That said, it may still be wise to allow the instructor greater control over the decisions in this market, within reason. Students must still feel that they are responsible for this account and its performance, but it cannot be ignored that irrational trading in cryptoassets could result in extremely rapid losses, and thus the loss of this opportunity for future cohorts. I would advocate for giving more direct advice on what size would be reasonable for a particular trade, as well as a veto power to prevent excessive risk-taking or potential day trading. For example, moving 30% of the portfolio into a small market-cap asset could be devastating if a new alternative quickly pushes it towards obsolescence. Generally, the assets with the largest market capitalizations should make up the vast majority of a portfolio's positions. The top five largest assets[14] combined are currently valued at over 70% of the total crypto market (with Bitcoin dominance at 42%). Smaller assets are most speculative and should be entered into in smaller stakes. For example, a fund may develop a policy that suggests 50-70% of the portfolio should be comprised of top two or three assets, with another 15-25% from other medium to large tokens and the remaining 10-15% in a set of smaller, more speculative positions. The exact values will, of course, change with the desired learning outcomes, however.

Security: While exchanges have become substantially more reliable in recent years, particularly with the development of institutional accounts, there are still significant security risks to consider. First, no institutional platforms yet allow for third-party logins for observational purposes. Thus, anyone that logs in is capable of engaging in all account functions, including trading and transferring funds. Students, therefore, cannot have access to login credentials. This results in some operational complications I will discuss in a moment, but for security purposes, only the instructor in charge of executing trades and at least one member of the institution's administration should have login credentials. The administration official(s) should be given primary control[15] with a succession plan in place to cover the event of turnover. Further, two-factor authentication is becoming more common for a variety of administrative functions and a crypto account is no different. These features will make it substantially less likely that any unauthorized individuals will be able to access the account and would alert multiple responsible parties should an attempt be made. Institutional security features at the college or university may result in the need to reauthorize the instructor's access somewhat regularly, but the tradeoff for security is certainly worth the additional effort. Lastly, as a final line of defense, institutional accounts maintain what is called

[14] Currently Bitcoin (BTC), Ether (ETH), Cardano (ADA), Tether (USDT), and Binance Coin (BNB).
[15] Requiring approval from them to access the account via any new devices.

a “whitelist” of external accounts for which withdrawals can be made to. We chose to remove all accounts from the whilelist after the crypto account’s creation and to set a 48-hour waiting period on any changes to it. Thus, no funds can be withdrawn from the account even if an unauthorized individual gained access, and all responsible parties would be notified if anyone attempted to add any accounts for withdrawal well in advance of their ability to do so. Similarly, for internal security, there should always be at least two responsible parties for the account. Note that this is not an exhaustive list of the security risks to consider, but rather a starting point.

Lack of Third-Party Logins: While this feature was promised at the time of account creation, and is presumably still in development, students still cannot view the crypto account as an observer at the time of writing. While this is unfortunate, there are a number of workarounds. There are apps students can download on their phones that allow for them to input the approximate positions the fund holds and track performance therefrom. These applications are often not free, however, and those that are free have substantial limitations (usually to the size of the account). A simple alternative, though, is simply to track positions using Excel. Students can update current market prices to see the status of the portfolio any time they wish to. While this isn’t as beneficial as being able to see the account value and positions in real time, it is sufficient for the time being. I’d like to believe observer accounts will be a feature rolled out in the next couple years, hopefully sooner.

Regulatory Risk and Delisting: Because these are new markets, regulators are still trying to figure out exactly how they should be handled. As a result, substantial regulatory risk exists, which could result in the freezing of trading certain securities. We first experienced this in December 2020. Shortly after the Securities and Exchange Commission (SEC) announced an investigation into Ripple (XRP), Coinbase decided to delist the token until resolution of the dispute. We held a position in XRP at the time, and thereafter, to the time of writing, we have not been able to adjust this position through our Coinbase account if we wanted to. It is worth noting that regulatory action from a single country, even the U.S., does not always spell the end for a token, as these markets are international. Indeed, the vast majority of XRP’s operations take place outside of the U.S. and the token’s performance has remained solid despite the dispute. In this particular case, it would still be possible for us to trade XRP, as we could open an account with another exchange that has not delisted the asset and transfer our balance. However, it is not outside the realm of possibility for regulatory obstacles to be more burdensome. On the whole though, these securities have now been integrated into corporate operations to a significant enough extent that it is unlikely the U.S. would ever ban the operation of these exchanges altogether.

CONCLUSION

The value of experiential learning through student-managed funds is well established and, thus, these programs have become much more common in recent years. In order to increase the value of such programs, many institutions have introduced the ability to trade securities beyond simply U.S. equities and fixed income. The introduction of cryptoassets to be traded by students at Roanoke College is another step in improving students’ exposure to various markets, as well as improving research and critical thinking skills. While the establishment of such a fund should be undertaken with caution and due diligence, this poses a valuable opportunity for students, particularly for those specializing in finance related fields as they prepare to enter an evolving industry.

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Importance of Mental Health in the Workplace for United States Adults

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Background

- Mental health is an important aspect of health care.
- Use a holistic approach to addressing mental health
- Mental health should be a priority for business
- Measuring mental health illnesses aids understanding of physical, social, and financial impacts
- Action goals help raise awareness, reduce stigma, and advocate for better health care

Statistics

- Depression is one of the most common mental illnesses
- Affects 6.7% of the population
- One in every five U.S. adults experience mental illness each year
- More than 50% of U.S. adults will be diagnosed with a mental illness or disorder at some point in their lifetime
- 4.7 % of adults aged 18 and over with regular feelings of depression
- 9.3% of physician office visits with depression indicated on the medical record
- In 2018, there were 4.9 million visits to emergency departments with mental disorders, behavioral, and neurodevelopmental as the primary diagnosis

Objectives

- Prioritize mental health
- Raise awareness
- Reduce stigma
- Avoid short-termism
- Improve company atmosphere
- Help businesses with costs and turnover rates

Lifestyle Impacts

- Poor mental health and work stressors can negatively affect employees, not necessarily one singular cause
- Can be triggered by various social determinants of health (biological, economic and social factors).
- The Healthy People 2030 objectives seek to reduce the burden of depression among adults in the United States.
- Associated with higher rates of disability and unemployment
- Can lead to increased costs for payers, employers, and patients
- Early detection, intervention, and appropriate treatment
- Remission, prevent relapse, and reduce the emotional and financial burden
- Interferes with physical job tasks about 20% of the time
- Reduces cognitive performance about 35% of the time

Conclusions

- Unemployment and poor-quality employment are risk factors for mental health disorders
- Job security and a sense of control at work help promote good mental health.
- Implementing a workplace mental health program would be beneficial Employers have a significant role
- The workplace is a great setting to create a culture of health
- Combine mental and physical health interventions

Management Action

- The workplace is a key intervention setting
- Promote mental health-friendly work culture
- Create a policy that employers are required to develop a workplace mental health policy
- Provide employees with support services such as counseling and treatment plans
- Increase the number of days to 14, to give 2 total weeks per year

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IMPROVING EXPERIENTIAL LEARNING TO BRIDGE THE STEM WORKFORCE GAP

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ABSTRACT

Colleges and universities provide valuable knowledge to students enrolled in accredited undergraduate cybersecurity degree programs. However, surveys of employers routinely indicate students from traditional programs are not workforce ready upon graduation due to two factors: lack of critical thinking/soft skills [1] and the inability to apply theoretical or abstract knowledge [2] learned in the classroom.

Student internships designed to close the gap must improve both quality and quantity. To develop workforce ready cybersecurity professionals, higher education must partner with employers to provide applied, hands-on, structured learning experiences and support small businesses. This paper discusses research projects conducted by an interdisciplinary team representing public, private, and educational sectors to: (1) increase and improve student experiential learning opportunities, (2) improve the overall workforce pipeline for high-demand STEM careers, and (3) increase employer awareness and engagement in experiential learning initiatives and resources. The paper reports initial results and recommends next steps.

INTRODUCTION

Colleges and universities provide valuable knowledge to students enrolled in accredited undergraduate cybersecurity degree programs. However, surveys of employers routinely indicate students from traditional programs are not workforce ready upon graduation due to two factors: lack critical thinking/soft skills [1] and the inability to apply theoretical or abstract knowledge [2] learned in the classroom.

The current approach to address this learning gap revolves around student internships. However, the quality and quantity of experiential learning opportunities limits the availability of effective experiences. Internship quality often suffers from unstructured experiences that provide little value for students and employers. Quantity is limited by the number of companies capable of offering internships. Small businesses, with an average of ten employees [3], represent 99.9% of all businesses in the United States. Most small employers do not have the experienced staff required to mentor a cybersecurity intern, especially in rural communities.

To develop workforce ready cybersecurity professionals, higher education must partner with employers to provide applied, hands-on, structured learning experiences and support small businesses.

To understand and address this critical concern, an interdisciplinary research team was formed consisting of educational and industry professionals representing Virginia's Commonwealth Cyber Initiative (CCI) and the DoD supported Innovative Discovery Platform (iDISPLA) to: (1) increase and improve student experiential learning opportunities, (2) improve the overall workforce pipeline for high-demand STEM careers, and (3) increase employer awareness and engagement in experiential learning initiatives and resources. To achieve these goals, the research team partnered with the public, private, and educational sectors to engage in various research projects and associated pilot implementations.

Initial outcomes of the research include: recommendations to help colleges, universities, and employers create more structure, suggestions to increase experiential learning opportunities in rural areas, and methods to create a replicable model. This paper discusses the initiatives, reports initial results, and recommends next steps.

SPONSOR ORGANIZATIONS

Commonwealth Cyber Initiative (CCI)

The state of Virginia established the Commonwealth Cyber Initiative (CCI), a highly connected network that engages higher education institutions, industry, and government, along with non-governmental and economic development organizations. It connects four regional nodes across Virginia, each led by a higher education institution, with the coordinating hub located in Arlington, Virginia. The Vision of the CCI is to establish Virginia as a global leader in cybersecurity research and serve as a catalyst for the Commonwealth's long-term economic leadership in this sector. The CCI serves as an engine for research, innovation, talent development, and commercialization of technologies at the intersection of security, autonomy, and data [4].

Projects associated with this paper received generous support from the CCI in general and associated efforts continue to be supported by the CCI nodes in Southwest Virginia and Coastal Virginia.

iDISPLA Team

The Innovative Discovery Science Platform (iDISPLA) was originally started by Dr. Nibir Dhar working with Prof. Erdem Topsakal as an initiative for the Army C5ISR Center Night Vision & Electronic Sensors Directorate for innovation, education, outreach and collaboration. Mr. Ken Spedden joined this initiative and together created a team of entrepreneurs and innovators transforming the iDISPLA model into an innovation platform to serve the Commonwealth of Virginia and the US Army with an aim to expand nationwide. in partnership with Dr. Dhar, Mr. Melvin Greer, Mr. Ken Spedden, and Mr. Bobby Keener undertook one of the more ambitious and transformative open innovation projects in the United States.

The iDISPLA initiative, using a fully functional innovation platform, applies new "ideas" that help drive innovation for the Army, the commonwealth, Communities of Interest, and ultimately, the United States. iDISPLA fosters education, R&D, collaboration, and workforce development by connecting, educating and inspiring already available talents, resources, and capabilities through a "Discovery Platform" [5].

Workforce is a specific area of focus for the iDISPLA team and iDISPLA members have been involved in all listed projects.

RESEARCH PROJECTS AND PILOT IMPLEMENTATIONS

Innovative Discovery Platform (iDISPLA) STEM Workforce Engagement

Sponsor: Department of Defense
Description: Secondary and higher education student engagement and talent identification via the evalua-

tion of crowdsourced student responses to industry-driven challenges. As part of this project, capabilities were also added to the iDISPLA platform to support the development of a rudimentary proof-of-concept component to perform online assessments, alignment of persons to training based on the feedback, and the placement and tracking of potential candidates training for a cybersecurity analyst career path.

Outcomes/Next Steps

1. Feedback from participating candidates, public sector workforce agencies, and employers…
    a. A new approach to recruit for high-demand career fields is warranted.
    b. The virtual approach to assessment via an online platform would be an approach that they would be willing to participate with and that the approach could be successfully extrapolated to other STEM as well as non-STEM career fields.
2. iDISPLA enhancements were added to allow for online assessment and tracking of candidates.
3. Additional features added to the existing iDISPLA Challenge capability.
4. Improvements learned from this project supported additional Challenges with Bowie State University, Old Dominion University, Penn State University, University of California (Davis), University of Florida, University of Virginia, Virginia Commonwealth University and Virginia State University. Students from universities were placed into teams supported by a professor. Teams competed via a well-structured experiential engagement associated with ideation.
5. Project served as the foundation/supporting research for additional projects listed (see below).

Leveraging AI and Machine Learning to Develop New CPSS and Workforce Development Solutions

Sponsor: Coastal Virginia Commonwealth Cyber Initiative (COVA CCI)
Description: Identify how to effectively automate matching of candidates to cybersecurity careers and associated training using personality assessments, Artificial Intelligence, analytics and novel data collection and assessment methodologies. The project leveraged private and university research, and crowd-sourced content and input to surface new approaches to mitigate business disruption related to cybersecurity issues/attacks using workforce assessments and experiential education via a secure platform (iDISPLA) and a cloud-based cyber insights engine.

Outcomes/Next Steps

1. Research takeaways…
    a. Simple, moderately difficult assessments create greater participation and can provide adequate feedback for new career entrants.
        i. Length of an assessment and user participation are directly related: longer assessments have lesser participation.
        ii. Difficulty of assessment questions can impact participation negatively.
        iii. Career potential (for cybersecurity that was studied) can be determined at a rudimentary level if a more rounded view is taken of a candidate via the use of less questions covering more categories (e.g., inductive reasoning, deductive reasoning, personality, analytical thinking and approach to learning) with shorter moderately difficult assessments.
    b. Assessments using the above approach if paired with the appropriate scoring mechanism can be used for multiple career paths due to their evaluation of core potential in multiple categories versus the evaluation of already attained knowledge.
2. An assessment (including question bank) and scoring mechanism that covered relevant categories (see above) was developed.
3. Digitization of the NICE Cybersecurity Workforce Framework in a Learning Management System

and alignment of data to the aforementioned cybersecurity assessment.

STEM Training Education Program (STEP)

Sponsor: SW Virginia Commonwealth Cyber Initiative (CCI)
Description: Program to identify existing students and non-students with cybersecurity career potential and place them in a registered apprenticeship program (RAP) supported by competency-based higher education training. STEP worked with Virginia institutions of higher education to identify students with the aptitude and attitude to enter a cybersecurity career field. Assessments and methodologies developed in other referenced projects were leveraged.

Outcomes/Next Steps:

1. CCI STEP will leverage a cultivated regional partner network to place cybersecurity interns and provide subsidized training.
2. In a limited social media engagement, the team received over 1200 respondents to a request to take the online assessment.
3. Using the developed scoring mechanisms, ten persons were selected to participate in the STEP program.
    a. Seven of the ten persons have been placed into cybersecurity Registered Apprenticeship Programs (RAPs) that consist of on-the-job training combined with accredited related technical instruction, mentorship, and hard and soft skills curriculum.
    b. The RAPs will lead to industry recognized cybersecurity certificates/certifications.
    c. Specific focus will be on students from non-traditional backgrounds.
        i. Diversity was achieved organically without specifying or implementing any socio-economic engagement criteria. Demographic information includes the following information regarding participation counts (categories may overlap):
            1. African American - 4
            2. Asian American - 1
            3. Females - 4
            4. Veterans – 2
    d. No participants have dropped from the program after nine months (of a one-year program).
4. Based on STEP, a new pre-apprenticeship program has been developed and funded to support community college and secondary student participation in shorter, well-structured, professional engagements to facilitate academic and experiential learning.

Experiential Learning: Continuous Improvement Advisory Board

Sponsor: Commonwealth Cyber Initiative
Description: Convening of professionals from public, private, and educational sectors to gain feedback on experiential learning activities (e.g., internships, apprenticeships), determine gaps, and establish best practices.

Outcomes/Next Steps:

1. Project is in the initial phases and outcomes are limited.
2. Next steps are to complete the discovery phase to include gaining feedback that has been solicited from participating board members related to their personal and organizational programs related to internships, apprenticeships and other types of experiential learning.

CONCLUSION

To close the STEM workforce gap and produce job-ready graduates, the quality of student internships must improve and the quantity of experiential learning engagements must increase. With support from Virginia's Commonwealth Cyber Initiative (CCI) and the DoD supported Innovative Discovery Platform (iDISPLA), an interdisciplinary team from the public, private, and educational sectors conducted research to address these critical needs. Initial outcomes show that higher education institutions must provide more structure around experiential learning and employers need guidelines and best practices to improve their programs and increase value. Rural communities face significant challenges due to the lack of employers with sufficient resources to provide experiential learning. Retention is also a major concern for rural areas that cannot afford to lose talent. Although extensive support and resources are available, no central repository exists to help employers, especially small businesses, identify and navigate the disparate sources of information. Communities must tap into the non-traditional pipeline, especially military personnel. K-12 internships and apprenticeships increase conversion to cybersecurity careers.

The research projects presented in this paper have shown promising results. The next step is to develop replicable and repeatable models while expanding the programs developed by these projects.

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IS THE INCREASE IN FINANCIAL LITERACY EDUCATION HAVING AN IMPACT?

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ABSTRACT

In recent years, there has been a dedicated and concerted effort by educators to improve financial literacy, both at the high school level, and in higher education. Unfortunately, several studies have suggested that these increased efforts may not be creating a lasting practical impact with American consumers. In this article, we analyze consumer data to determine American consumers' spending habits from 2005 – 2019 in an attempt to determine if increased financial literacy education efforts are correlated with decreased spending (a very basic habit for the financially literate). The results suggest that irresponsible spending (spending more than one's income) has actually increased for consumers under the age of 25, but has improved for those aged 25 to 34. Given that current efforts to improve financial literacy appear to be lacking for the nation's younger consumers, we propose additional educational initiatives that take place both in and out of the classroom.

INTRODUCTION

At its most basic level, "financial literacy" can be considered the ability of an individual (or family unit) to make appropriate decisions in regard to managing personal finances. However, delving deeper into the definition, "financially literate consumers" are able to understand how their money works in the overall financial system, and have the skills and knowledge needed to make informed and (overall) effective decisions in regard to their financial resources.

As financial products and services become more nuanced and complicated, there is the opportunity for financially literate consumers to take advantage and enjoy positive financial impacts. New low-cost alternatives are available (generally using technology and mobile applications) that provide budgeting help, investing opportunities, insurance comparisons, and banking options. However, for those consumers without the financial background to understand how these new systems work, there is increased opportunity to be taken advantage of, or to make decisions that do not match one's long-term financial goals. Unfortunately, these new technologies also allow consumers to implement poor financial decisions with ease.

As a case-in-point, in 2020, a young man named Alexander Kearns tried his luck on Robinhood, a mobile brokerage app that allows individuals to buy and sell securities from an easy-to-use online brokerage account. Robinhood made complex option trades available to the 20-year-old, and Alexander took advantage of the ease at which he was able to participate in the derivatives market. Unfortunately, Alexander placed an option trade that resulted in the loss of his initial premium. However, due to his lack of understanding related to option trading settlement procedures, he believed that he had lost over $730,000 on the trade. The fear of owing this terrible level of debt was too much for Alexander, and he sadly took his own life over his simple, but extreme, misunderstanding.

Many educators and policymakers would argue that this 20-year-old, with no knowledge or information on option trading procedures, had no business participating in derivatives markets. However, technology is making it so that implementing financial strategies (either good or bad) is easily available to everyone.

Technology changes aside, the dedication of policymakers and educators to improve financial literacy in America is not without merit. According to a recent study by the Standard & Poor's Global Financial Literacy Survey that measures the percentage of the adult population who would be considered "financially literate", the United States financial literacy level is only at 57%. This is just slightly higher than the financial literacy level of Botswana, a country whose economy is over one thousand times smaller than the United States (Iacurci, 2019).

American's low level of financial knowledge is a known issue. Numerous studies have demonstrated that Americans demonstrate an alarming lack of general personal financial knowledge (Lusardi & Mitchell, 2007; Bucks & Pence, 2008; Lusardi & Mitchell, 2010) and much has been done in recent years to try to enhance the financial literacy of the country. In fact, out of 435 colleges and universities analyzed by Crain (2013), only 37 schools still listed their "personal financial literacy" course as an elective. However, despite these efforts, some research suggests that the problem is only getting worse. In five large scale financial surveys between 1997 and 2006, Mandell (2006, 2008) found that the ability of American consumers to make age-appropriate financial decisions in their own self-interest had actually deteriorated. Further, it was found that high school classes in personal finance had no discernable impact.

These findings are particularly troubling since increased coursework in the area of personal finance has been one of the primary means that policymakers and educators have utilized to increase financial literacy. Unfortunately, research suggests that these efforts may not be producing the desired results. In another study, Mandell and Klein (2009) found that students who completed a personal financial management course in high school were no more financially literate than those who had not taken it. In addition, some research has questioned whether the poor financial behaviors (or financial knowledge) of personal finance educators have actually contributed to the poor impact results (Deng, et al., 2013).

In this paper, personal financial behaviors are analyzed to better determine if financial literacy efforts might be having the desired impact. Is the increased attention and coursework around financial literacy making a difference? Are younger American consumers making better financial decisions today than they were years ago?

METHODOLOGY

In the field of personal finance, there is likely no more basic requirement for long-term financial success than to "live within one's means." Consistently spending more than one brings in will practically guarantee financial trouble over the long term. Given the simplicity of this concept, regardless of a consumer's understanding of how their money fits into the overall financial system, even the most financially unsophisticated consumers *should* understand that they cannot spend more than they make without negative long-term consequences.

Expanding on this basic concept, a popular rule of thumb in financial planning is that consumers should dedicate at least 20% of their income to savings and debt repayment[1]. This benchmark is taken from the "50/20/30 budget rule" made popular by Senator Elizabeth Warren (a Harvard law professor when she coined the term). The rule states that consumers should spend 50% of their income on needs, 30% on wants, and then allocate 20% to savings and other financial goals. Therefore, for the purposes of this simplified analysis, we will assume that consumers who spend less than 80% of their income could be considered "financially literate" at the most basic level.

After creating a spending benchmark of 80% of income, we then analyzed consumer income and expenditure data obtained from the U.S. Bureau of Labor Statistics. Each year, a Consumer Expenditure Survey is conducted which provides income and expenditure data about the American population[2]. While the data provided in the survey is extensive, we have included a portion of the data in Table 1.

For the purposes of our study, we analyzed eight years of data between 2005 and 2019 to determine the level of spending (as a percentage of income) of two groups: 1) Consumers under the age of 25 and 2) Consumers between the ages of 25 and 34. Since most financial literacy efforts are focused on younger age groups, these two groups may best represent the impact that these efforts are making from a practical financial perspective.

Specifically, we took the average annual total expenditures for each age group and subtracted the expenditures for Social Security, personal insurance, and pensions (the only expense listed in the survey that would contribute to a consumer's financial goals). We then divided this number by total income after taxes. As an example, a calculation of 101% would suggest that the age group spends 101% of their income on expenses. As stated above, consistently spending more than one's income suggests a lack of financial literacy. However, a calculation of 75% would suggest that the age group is spending 25% less than they earn. This level of spending would suggest a more financially literate consumer, who is making financially-sound decisions. Results for the two groups are found in Table 2.

Table 1

Income & Expenditure Data by Age
2005 - 2019 (Every Other Year)

		All consumer units	Under 25 years	25-34 years	35-44 years	45-54 years	55-64 years	65 years and older	65-74 years	75 years and older
2019	Income before taxes	$82,852	$38,120	$76,187	$103,272	$107,094	$99,606	$55,656	$65,943	$41,937
	Income after taxes	71,487	35,578	67,887	89,486	91,384	81,865	49,445	57,371	38,873
	Average annual expenditures	$63,036	$39,293	$57,128	$74,890	$77,356	$69,494	$50,220	$55,087	$43,623
	Personal insurance and pensions	7,165	3,335	7,261	9,564	10,374	9,203	2,843	3,826	1,532
2017	Income before taxes	$73,573	$31,750	$69,062	$86,782	$100,213	$85,037	$49,097	$58,040	$36,537
	Income after taxes	63,606	29,960	61,145	75,609	83,939	71,520	44,051	50,721	34,684
	Average annual expenditures	$60,060	$33,629	$55,325	$69,034	$73,905	$64,972	$49,542	$54,997	$41,849
	Personal insurance and pensions	6,771	2,567	6,590	8,341	9,622	8,705	3,230	4,091	2,020
2015	Income before taxes	$69,627	$31,606	$64,472	$84,938	$95,248	$75,262	$46,627	$54,067	$36,408
	Income after taxes	60,448	29,612	57,274	72,980	79,845	63,984	42,959	49,079	34,553
	Average annual expenditures	$55,978	$32,797	$52,062	$65,334	$69,753	$58,781	$44,664	$49,477	$38,123
	Personal insurance and pensions	6,016	2,540	5,879	7,399	9,305	7,181	2,401	3,289	1,182
2013	Income before taxes	$63,784	$27,914	$59,002	$78,385	$78,879	$74,182	$45,157	$53,451	$34,097
	Income after taxes	56,352	26,559	53,178	69,152	68,048	63,312	41,885	48,742	32,744
	Average annual expenditures	$51,100	$30,373	$48,087	$58,784	$60,524	$55,892	$41,403	$46,757	$34,382
	Personal insurance and pensions	5,528	2,203	5,304	7,081	7,672	7,033	2,396	3,392	1,068
2011	Income before taxes	$63,685	$27,514	$58,179	$77,376	$78,519	$75,517	$43,232	$52,521	$32,144
	Income after taxes	$61,673	$27,495	$56,851	$75,537	$75,234	$72,115	$42,326	$51,161	$31,779
	Average annual expenditures	$49,705	$29,912	$48,097	$57,271	$58,050	$53,616	$39,173	$44,646	$32,688
	Personal insurance and pensions	$5,424	$2,220	$5,346	$7,068	$7,453	$6,775	$1,985	$2,957	$825
2009	Income before taxes	$62,857	$25,695	$58,946	$77,005	$80,976	$70,609	$39,862	$47,286	$31,715
	Income after taxes	$60,753	$25,522	$57,239	$74,900	$77,460	$67,586	$39,054	$46,147	$31,272
	Average annual expenditures	$49,067	$28,119	$46,494	$57,301	$58,708	$52,463	$37,562	$42,957	$31,676
	Personal insurance and pensions	$5,471	$1,988	$5,303	$7,122	$7,654	$6,793	$1,856	$2,669	$964
2007	Income before taxes	$63,091	$31,443	$57,256	$76,540	$80,560	$71,048	$40,305	$47,708	$32,499
	Income after taxes	$60,858	$30,802	$55,765	$74,051	$77,075	$67,965	$39,179	$46,334	$31,634
	Average annual expenditures	$49,638	$29,457	$47,510	$58,934	$58,331	$53,786	$36,530	$42,262	$30,414
	Personal insurance and pensions	$5,336	$2,440	$5,159	$6,980	$7,489	$6,193	$1,819	$2,600	$996
2005	Income before taxes	$58,712	$27,494	$55,066	$72,699	$75,266	$64,156	$36,936	$45,202	$28,552
	Income after taxes	$56,304	$27,120	$53,257	$69,619	$71,442	$61,068	$36,007	$43,976	$27,924
	Average annual expenditures	$46,409	$27,776	$45,068	$55,190	$55,854	$49,592	$32,866	$38,573	$27,018
	Personal insurance and pensions	$5,204	$2,133	$5,123	$6,929	$7,348	$5,909	$1,775	$2,580	$959

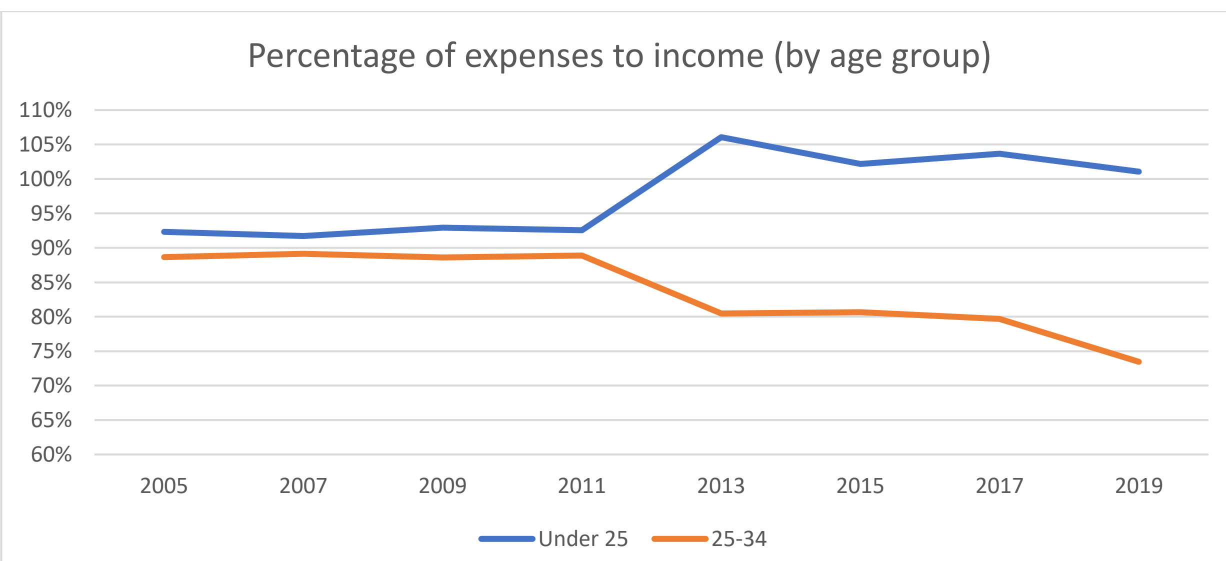
Table 2

Percentage of Expenses to Income (By Age Group)		
	Under 25 Years	Between 25-34 Years
2005	92.3%	88.6%
2007	91.7%	89.1%
2009	92.9%	88.6%
2011	92.6%	88.9%
2013	106.1%	80.5%
2015	102.2%	80.6%
2017	103.7%	79.7%
2019	101.1%	73.5%

RESULTS

Given the available research on the decreasing level of financial literacy among Americans despite increased efforts to educate consumers to be able to make smart financial choices, it does not come as a surprise that our analysis seems to reinforce the findings that young American consumers are engaging in increasingly more irresponsible financial behaviors. While consumers under the age of 25 appeared to utilize approximately 92% of their income on expenditures from 2005 through 2011, this percentage appears to have increased substantially in recent years. Since 2013, American consumers under the age of 25 have continued to spend more than they earn.

Figure 1



However, while the results of our research for consumers under age 25 are disturbing, our findings do indicate some positive financial habits for American consumers aged 25-34 years. In fact, while the "under 25" group's financial habits appeared to have dramatically deteriorated after 2011, the "25-34" group seems to have substantially decreased their spending as a percentage of income over the same time period. While the "25-34" group appeared to consistently spend approximately 88% of their income from 2005 to 2011, the group substantially lowered their expenditures as a percentage of income between 2011 and 2013. The group now appears to have the 20% (recommended) to allocate to savings and other financial goals. See Figure 1 for more information.

CONCLUSION

The spending changes that take place between 2011 and 2013 are perplexing. While the "under 25" age group worsens, the "25-34" age group improves – both quite dramatically. Why? Could this be a reaction to the Great Recession? If so, the timing seems odd given that the largest financial impacts to consumers were experienced in 2008 – 2009. However, the timing of the changes corresponds quite well with the growth in financial technology tools. Could these changes be a side effect of fintech? Maybe younger college-aged consumers tend to use new fintech discount brokers more heavily than in the past to speculate on stocks (GameStop, AMC) and other securities. Losses incurred speculating could worsen budgets and create the need to spend a greater percentage of income. In contrast, perhaps after graduating from college, younger consumers begin to use fintech to their advantage, possibly using robo-advisors and budgeting apps to obtain low-cost financial advice. Or perhaps this is simply the result of financial literacy efforts frustrating students while still in school, but finally taking hold and influencing smarter financial habits after graduation. Regardless, this is an interesting finding that is worthy of future research.

For the purposes of this study; however, it appears as if current financial literacy efforts may not be the waste of time that some studies have suggested. Many youths do report engaging in some financially-savvy behaviors (Beverly & Burkhalter, 2005) and the results of this study suggest that strong financial habits learned in school may aid consumers in making wise financial decisions as they become more stable in their lifestyle and career development. This is logical given that the subject matter of many college-level personal finance courses primarily covers topics that would be most beneficial after graduation.

Based on the improvement of financial habits for those aged 25 to 34, it appears that the dedicated efforts of today's educators to improve the financial literacy of young Americans may be warranted and beneficial. Even though several studies have suggested that student retention of personal finance topics is low, perhaps financial strategies learned in school are recalled later in life, reducing the real-life learning curve, and thus influencing consumers to make smarter financial choices soon after graduating from college (when their financial lives arguably become much more stable and predictable). However, additional efforts could prove beneficial to aid younger consumers in making smart financial choices as well.

As with many good habits (financial and otherwise), the younger one can start, the better and more powerful the long-term impact. New methodologies to personal finance education may be the answer. For instance, many of the higher education institutions who still listed their school's financial literacy course as a general elective only, were very much in favor of the topic, but believed that the subject matter could be better addressed through other types of activities and co-curricular endeavors. In fact, several of the most recognized financial literacy programs in the country are not limited to coursework alone, but are much more practical and experiential in nature.

The Red to Black program at Texas Tech, for instance, offers personalized coaching, presentations, and workshops to all students. This immersive and personalized experience offered by students pursuing financial planning degrees covers important financial topics such as budgeting, financial aid, benefits, credit card spending, investing, and even free tax preparation. Students enrolled in financial planning coursework coach their peers from other majors through individual coaching sessions, outreach booths, and resource referrals. Because of their success, the program has been recognized by the Association for Financial Counseling and Planning Education and has been acknowledged by numerous other media outlets and organizations for their innovative approach.

Another acclaimed financial literacy effort belongs to Stanford University, which offers students and graduates with numerous specialized educational programs in different areas of personal finance. Many of these programs are designed to introduce students to recent Stanford graduates, specializing in different fields of finance, including banking, benefits, credit, insurance, investing, and managing education debt loads. One of the goals of this program isn't simply to provide students with the resources necessary to be able to make informed financial decisions after graduation, but to begin making smart financial choices while still in school.

Given the success of these programs and the findings of this study, perhaps now is the time for colleges and universities, concerned about the nation's abysmal financial literacy rates, to begin to strategize methods that directly address students' financial needs today, in addition to their lives after graduation. For example, many traditional personal finance classes (and textbooks) spend a considerable amount of time covering topics such as mortgages, life insurance, and estate planning. While these topics are arguably important to families and older graduates, most college students may not see the benefit (at least not yet). By providing additional opportunities for students to focus more deliberately on topics pertinent to their lives today (examples might include: credit cards, paying for college, and rental insurance), it is possible that financial literacy educators in higher education could begin to influence stronger financial habits even earlier in life, thus creating a more powerful and long-lasting impact. Perhaps with a renewed and dedicated focus to address the financial needs of college students today through coursework and other innovative co-curricular endeavors, we could begin to dramatically improve financial literacy rates in America. And as a side effect, colleges might find that alumni have more money in their pockets…

END NOTES

1. https://www.investopedia.com/ask/answers/022916/what-502030-budget-rule.asp. See the 50/20/30 Budget Rule.

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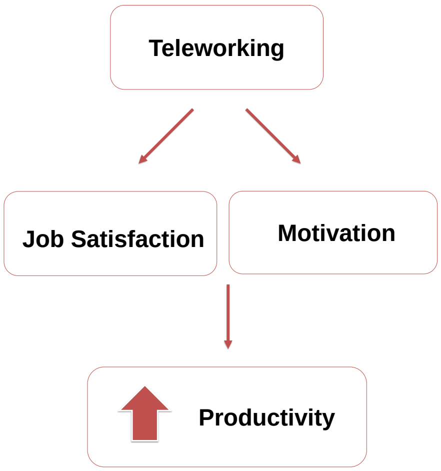
Job Satisfaction, Motivation, and Productivity in Telework

Emily Curfman, Dr. Johanna Sweet

Literature Review

Despite the many workplace challenges that have come with the recent pandemic of COVID-19, teleworking can be beneficial for many employees and result in an increase in job satisfaction and motivation and therefore, greater productivity.

Research Design



Findings

- Employers should be aware that teleworking increases job satisfaction (Wang et al., 2021)
- Teleworking increases motivation (Konradt et al., 2010)
- Job satisfaction increases productivity (Steward, 2000)
- Motivation increases productivity (Konradt et al., 2010)
- Workplace support for teleworkers was positively associated with job satisfaction (Wang et al., 2021)
- Working from home generates a greater level of trust between the employee and the manager (Merone & Whitehead, 2021)
- Employees who have greater home responsibilities are more productive teleworkers (Schur et al., 2021)
- Teleworking can lead to greater employee retention (Cho, 2020)
- Telework improves efficiency in performing tasks and work concentration (Baert et al., 2020)

Research Questions

1. Does teleworking increase job satisfaction?
2. Does teleworking increase employee motivation?
3. Does job satisfaction increase productivity?
4. Does motivation increase productivity?
5. What are the positive aspects associated with teleworking?

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MACHINE LEARNING WITH APPLICATIONS

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Machine Learning with Applications (MLWA) is a peer reviewed, open access journal focused on research related to machine learning. The journal encompasses all aspects of research and development in Machine Learning (ML), including but not limited to data mining, computer vision, natural language processing, intelligent systems, neural networks, AI-based software engineering, bioinformatics and their applications in the areas of engineering, medicine, biology, education, business and social sciences. It covers a broad spectrum of applications in the community, from industry, government, and academia.

The journal publishes research results in addition to new approaches to ML, with a focus on value and effectiveness. Application papers should demonstrate how ML can be used to solve important practical problems. Research methodology papers should demonstrate an improvement to the way in which existing ML research is conducted.

MARKETING STRATEGIES AND THE IMPACT ON PERFORMANCE IN RESPONSE TO COVID

Cause-Related marketing campaigns are complex promotional tools that present organizations with numerous strategies for implementation. Cause-related marketing (CRM) has labeled as profit motivated giving due to the linkages created between company sales and charitable donations (Varadarajan and Menon, 1988). As corporate responsibility continues to increase in importance, so has corporate social activity, and executives are far more proactive in regards to the tactics utilized in giving funds that are congruent with the firm's corporate social responsibility strategy. Unlike corporate donations, where contribution is based on altruistic motivations of management and shareholders, corporations launch strategic initiatives that considers the gifts and practices as investments and calculates returns for the firm (Orlitzky et al, 2003). A central question to consider is how does campaign duration ultimately influence firm performance? These strategies can be designed to increase short term sales, build goodwill, improve firm reputation, or develop long-term support of chosen altruistic causes. Organizations will vary in the desired outcomes of selected CRM strategies, and many may find it difficult to maximize the return on investment. A firm may engage in a one-time campaign to take advantage of a prevalent movement and benefit from immediate positive publicity. Conversely, firms may choose to participate in long-term support to build a stronger brand identity and association with a desired cause or result. The goal of this research is to determine the optimal type of CRM strategy to maximize firm performance relative to the firm's competitive environment.

Firms may engage in a one-time campaign to take advantage of a prevalent movement and benefit from immediate positive publicity, such as current business practices stressing cleanliness and disinfecting procedures. In response to Covid-19 and its variants, firms have engaged in a multitude of approaches with mixed results. Business sectors focusing on dining, entertainment, shopping, among other pubic activities have struggled to find an appropriate response to meet the growing concerns of consumers. The responses firms have taken represents a multitude of strategies focused on the short term promotion of initial responses to health concerns, others have focused on fundamentally changing business operations, revamping staffing policies, and customer service. The goal of this research is to determine the optimal type of CRM strategy to maximize firm performance relative to the firm's response in the Covid environment.

Previous research has classified the taxonomy of strategies into four main forms based on donation type: sponsorship, transaction based, joint promotion, and in-kind contribution (Gupta and Pirsch, 2006). The research in this paper relies on these four components as a basis for a proposed framework of CRM/Covid response strategies. The first strategic strategy is Single Event. This strategy is restricted to single, isolated events, that are directly attached to an organization, event, or cause. This is commonly implemented as a response to specific consumer concerns or government mandates. In the case of Covid responses this can mean an adoption of additional cleaning procedures, temporarily limiting customer access, or even the lack of response and conducting "business as usual". The second strategy is an intermittent response. This strategy involves an organization implementing additional safety measures or policies during a specific time frame to raise awareness of its standardized response and reduced response implementation time. The third type of strategy is a long-term shift in business operations. A long-term strategic shift involves the organization fundamentally changing aspects of business models in response and advertising initiatives and focuses on the response as a means of conveying the change in operations to reflect the concern for public safety. The content of this message reflects the organizations desire to communicate new safety policies and options available to consumers. The final strategy is to make CRM part of the organizations core identity. These organizations have made a particular CRM initiative a part of the business model since inception or have adopted a permanent campaign.

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New Era in Correctional Management: The Oncoming Dilemma of Hospice and End-of-Life Processes

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ABSTRACT

Prison officials are faced with an aging inmate population who brings a variety of special medical needs. The standard of medical care required by case law demands special programs for the aged inmate. Due to a variety of reasons, including sentencing guidelines and long-term sentences (i.e., life sentences), the options of release have diminished leaving the need for palliative and hospice programs for inmates. As the need for such specialty programs increases, prisons are inept for such programs due to the many moving parts of such programs within the wall of a security-controlled environment. This paper produces a valid theoretical model that addresses the need and implementation of palliative and hospice care for inmates who are entering end-of-life. Considerations are given between two paradigms, the compassion model by healthcare providers and the security-minded officers, for which the model addresses. The model addresses the comparison between in-house programs for end-of-life care and the alternative of compassionate release, along with the importance of partnerships for both.

INTRODUCTION

The increasing representation of older people in prisons and jails is a well-documented trend (Duin & McSweeney-Feld, 2005; Human Rights Watch, 2010; Maschi, et a.., 2012; Stojkovic, 2007; Williams, 2006; Williams & Rikard, 2004) that involves at interrelated concerns for multiple stakeholders: corrections administrators and staff, correctional health and medical practitioners, and older people who are incarcerated. First, although definitions of the "older inmate" vary and range from 50 and older to 70+ (ACLU, 2012; Human Rights Watch, 2010, p. 17), there is firm consensus

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that aging inmates represent the "fastest growing segment of the prison population" (Maschi et al., 2012, p. 2) in the United States and elsewhere (Davies, 2011: Parrish, 2003). In the United States within the past 5 years, although the growth in the state and federal prison total population has risen by less than 1%, the population of people 65 and older increased by 63% during the same time frame (Human Rights Watch, 2010, p 18). The Pew Research Center (2010) reported that beginning in January 2011, the baby-boomer generation in the U.S. began turning 65 at the rate of 10,000 individuals per day and will remain at that rate until 2030. Altogether, people 55 and older represent about 8% of the total state and federal United States prisoner populations, up from about 3% of this total in 2000 (Human Rights Watch, 2010, p. 21). Between 1992 and 2001, state and federal inmates age 50 and older grew by 172.6% and between 2007 and 2010, the population of inmates age 65 and older grew 94 time faster than the overall prison population (Rajagopalan, 2013; Ridgeway, 2013). Between 2005 and 2006, the number of geriatric female prisoners in California increased by 350% (Williams et al., 2006). The ACLU estimates that by 2030, about one-third of prisoners will be over age 55 (Ridgeway). This "silver tsunami" (Human Rights Watch, 2010, p. 12) in United States corrections systems has been documented elsewhere as well, especially in developed countries (United Nations Office on Drugs and Crime-UNODC, 2009). Japan experienced a 160% increase in the number of prisoners 65 and older between 2000 and 2006. In the United Kingdom, this same subgroup increased by 216% between 1990 and 2000 (UNODC, 2009, p. 125).

Second, as a group, incarcerated people carry a substantially high burden of mental and physical (e.g., infectious and chronic) illnesses as well as disability in comparison with the general population (Bingswanger 2010: Condon et. al., 2007; Hayton, 2007: Wakeman & Rick, 2007). People with mental illnesses are over-represented among people who are incarcerated (Torrey et al., 2010), with prevalence estimates of nearly 17% of incarcerated people having a serious mental illness (Steadman, Osher, Robbins, et al., 2009). People who are incarcerated tend to come from communities characterized by substantial health and health care inequities (Moore & Elkavich 2008), and, not surprisingly, have a history of no regular access to health care services prior to incarceration (Hayton 2010).

Among the incarcerated, older people tend to bring to the incarceration experience a more lengthy personal history of poor access to health care services (Hayton, 2010), rates of illness at the point of entry that are nearly double compared to younger inmates (Council on State Governments, 2004, p. 14), and a greater vulnerability to and expedited experience with normal age-related physical and mental health problems that are believed to contribute to elevated rates of anxiety and depression (Condon et e.., 2007, p. 217). The older inmate also encounters higher rates of physical assaults and psychological victimization via verbal denigration and taunting (Kerbs and Jolly, p. 207), and prolonged imprisonment believed to accelerate the process of aging and the concomitant health status of individuals by as much as 10 - 15 years because of the "health and environmental risk factors associated with" long-term imprisonment (Wilson & Barboza, 2010, in Maschi et a.., 2012, p. 2).

Third, the costs associated with incarcerating an older person are substantially higher compared with the costs to incarcerate a younger person: most estimates suggest a threefold difference. In 2013, approximately 10% of federal prisoners was a lifer with the same percentage of inmates over 50 serving 30-years to life (Ridgeway, 2013). In United States dollars, the average cost per year to house an older (50+) person is about $70,000 compared with about $34,000 to house a younger person (ACLU, 2012; Council of State Governments, 2004; Maschi, 2012; Smyer & Burbank, 2009). One reason for the disparity of costs is due to the higher healthcare costs for older inmates. This continues to be a concern for government officials due to its effect on budgets. Young (2013) reported inmate healthcare consumes between 9% and 30% of correctional budgets. The Affordable Care Act (ACA) did little to address head-on care of incarcerated individuals. This population is excluded from coverage. Therefore, the budget requirements fall directly on correctional agencies. However, other parts of the ACA may still be beneficial, especially to those in jails who are listed as pre-trial. For example, individuals below the age of 26 may still be covered by parents' insurance plans, a provision of the ACA, which would help alleviate some healthcare costs. The problem is that this population is the least expensive the vast budgetary healthcare expenditures.

Fourth, in the United States and elsewhere, the concerns over correctional budgets amid the financial pressures ongoing, large state, or national budget deficits have compelled many local, state, and federal courts and correctional agencies to" revisit their sentencing and release policies" (Pew Center on the States 2010, p.1). In this context, the costs associated with housing older inmates are increasingly weighted against benefits and risks associated with early or medical release for older people who are incarcerated (Rikard & Rosenberg, 2007).

These four concerns have garnered little systematic research attention that includes the perspective of multiple stakeholders and an awareness of the oncoming influences on human health and end-of-life for incarcerated individuals. In this article, I argue that the dilemma faced by correctional officials to provide adequate healthcare to an aging population along with end-of-life processes that help ease the budgetary, social and physical burden for correctional agencies can no longer be ignored. I provide a working model to help correctional leaders create effective processes to facilitate programs that help address and maintain the emotional, physical, and social needs of those who face the end-of-life in prison.

Although there exist myriad proposals for how best to confront the individual and system related needs associated with elderly people who are incarcerated (e.g., Snyder et al., 2009), relatively few sufficiently address the elements of a framework or incorporate an adequate methodology for understanding the unprecedented individual and public health crisis (Moore & Elkavich, 2008) associated with the circumstances of older, incarcerated people. Most scholarship on health issues in prisons has been framed by a reductionist medical model of health (Martin et al., 2009, p. 105). With few exceptions (Martin et al., 2009), most have failed to recognize the social, contextual, and environmental influences on health (Martin et al., 2009). The most common inquiries of health in prisons have involved comparative examinations of pre-existing illness conditions (e.g., Aday, 1994; Wang and Green 2010), functional impairment (Young and Reviere, 2001), drug abuse or addiction patterns (Fazel, Bains, & Doll, 2006), the incidence or prevalence of illness and infectious disease during incarceration, disability (Desesquelles, 2005), violence experiences, as well as access to and quality of health, medical, and special services care during incarceration (Schneider and Sales 2004).

Albeit important, they present an incomplete picture of the scope of the problem as it relates to the range of variables that systematically impact prisoner health and well-being, especially those of older inmates who need palliative care. They do not involve a framework for examining contributions of the prison setting or environment *per se* to the health of the incarcerated, particularly older people.

As a relatively unexamined element within a "settings approach" (Hayton, 2007) to the health of people in prison, this paper highlights the conflict of paradigms, processes, and culture that effect health issues facing people who live within the walls of prisons. I begin with an overview of the charges assigned to prison administration relevant to health and health care issues, discuss elements of the conflict between the prison administrative paradigm and healthcare administration, and the built environment and procedures within prisons that are relevant to prisoner health. I conclude with a summative model of hospice and palliative care for end-of-life inmates that support the institutional environment while providing adequate social, emotional, physical, and healthcare needs for the aging inmate.

Administrative Environment

Charges and Challenges

Effective, safe, and constitutional administration of correctional facilities is a task that falls exclusively within the purview of corrections officials (WHO, 2007, p. 3). Prison administrators simultaneously coordinate, manage, and monitor a core set of mandated services that encompass the security, safety, and decency (e.g., visitation, meals, housing, medical, fair classification) guarantees for incarcerated people. Yet, the juxtaposition of these charges with the changing composition and needs of contemporary prison populations has created an extraordinary challenge for prison administrators (Johnson, 1999).

To begin, current prison administrators everywhere confront a volume and heterogeneity of inmates that are historically unprecedented. In terms of representation, there are more females, infirm, older people, the mentally ill, and other special prisoner populations (e.g. LGBT) than ever before and their proportions have been growing

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rapidly in recent years (UNODC, 2009). Their management continues to require an array of new technology, classification systems, architecture, programs, standards, policy, strategic planning, performance measurement, and supervision strategies that have been described as an undertaking to implement and oversee (Thivierge-Rikard & Thompson, 2007). In many respects, these elements are concomitant to prison management and have been created in response to a legislative context and social get-tough milieu that are the source of the trends in prison populations, especially the graying of prisons (Daly, 2002).

While prison administrators are charged to provide health care services under constitutional mandates, (e.g., *Estelle v. Gamble*, 1976), some states' correctional systems have yet to fulfill the basic rights established since *Estelle*: the right to 1) access to health care, 2) care that is ordered, and 3) to a professional medical opinion (Rold, 2008) To some extent, this reality is the outcome of dire state corrections budgets, but also related, albeit indirectly, to public sentiment concerning the role of prisons in society.

In the contemporary economic crisis, anecdotal evidence suggests that ideologies external to prisons view the main goal of the prison system as a crime deterrent rather than a health care setting or place of rehabilitative processes. Where the older prisoner is concerned, adequate health care and a safe environment are especially paramount (Thivierge-Rikard & Thompson, 2007). Because there is no legal mandate or policy for geriatric specific services (Maschi, 2012), inattention to settings elements and their role in prisoner well-being may serve to maintain carceral influences that are unacceptable on ethical or humanitarian principles and potentially impactful well beyond reentry. Older inmates who cannot independently carry out daily activities tend to negotiate their environment and require compensatory support (Filinson, 2014). Some operational strategy options that remain unresolved and have included integration versus segregation, with strong proponents on each side offering valid concerns that each strategy addresses from the perspective of the individual (e.g., security needs of older inmates) and institution (e.g., the removal of a stabilizing effect of older prisoners on the general prison population).

Within this administrative context, the burgeoning proportion of older inmates has created a scenario where demands for health care needs have become more acute, less affordable within fiscally challenged systems, yet potentially imperative to the extent that many courts in the United States are inundated with appeals for constitutional standards of health care since *Estelle* (Stojkovic, 2007). Sterns, Lax, Sed, Keohane, and Sterns (2008) found that approximately 32% of prison official respondents reported having dedicated units solely to the management of older inmates. According to a 2004 national survey by the National Institute of Corrections (NIC), 23 states owned a hospice unit in their correctional system (Anno, 2010).

The health care needs of older people in prison have ushered in inherent management and operational implications, especially since older prisoners are a subgroup that present with health conditions that require nontraditional correctional options and which tend to command opposing viewpoints on best management practices. Such conditions include, but are not limited to, end-of-life care, Alzheimer's disease and dementia, and chronic mental health problems which taken together, tend to defy traditional modes of supervision and management (Stojkovic, 2007). Older inmates who cannot independently carry out daily activities tend to negotiate their environment and require compensatory support (Filinson, 2014). Some operational strategy options that remain unresolved and have included integration versus segregation, with strong proponents on each side offering valid concerns that each strategy addresses from the perspective of the individual (e.g., security needs of older inmates) and institution (e.g., the removal of a stabilizing effect of older prisoners on the general prison population).

Adequacy of Healthcare

Over the last 40 years, the pendulum of the role of prisons has continued to swing back and forth between two philosophies. Overall, prisons have been viewed inefficient as rehabilitation centers, given a remaining high recidivism rate (Tittle, 1974). Many rehabilitative programs have been eliminated due to budget constraints. One of the catalysts for these reductions is the rising cost of healthcare in prisons. As basic healthcare costs continue to rise, budgets continue to rise to accommodate these services. Based on the statistics of graying inmates in the system, along with their longevity of sentences, the provisions of adequate healthcare continue to impact the budget process for correctional agencies. The prevalence of certain poor health conditions is indeed greater in prisons than in the general population (Bolger, 2005). Prior to incarceration, many individuals lack adequate resources for preventive care, age more rapidly than their counterparts, and are at more risk to contract communicative disease leading to terminal illness (Yampolskaya & Winston, 2003). Most practice habits that contribute to poor health, including poor hygiene, use of tobacco, alcohol, and illicit drugs. Many are never diagnosed with illnesses or terminal diseases until incarceration, creating the burden on correctional agencies to treat these illnesses adequately as required by the Eighth Amendment. Aging by itself brings an increase incident in deaths. Add the problem of aging with lifestyles experienced by inmates in the general population and there are other factors that administrators must be concerned with. Such factors include communicable disease, substance abuse, lack of preventive medical care, HIV, Hepatitis B and C. (Linder et al., 2002)

Two major decisions by the United States Supreme Court set the baseline standard for the adequacy of healthcare in correctional setting. In *Estelle v Gamble* (1976), the Court established that a determination of prison care inadequacy requires a finding that prison officials display a deliberate indifference to serious medical needs of prisoners. In its ruling, the Court made it clear that its conclusion did not mean that every claim by a prisoner noting failure to receive adequate medical treatment constitutes a violation of the Eighth Amendment. Again in 1996, Congress enacted the Prison Litigation Reform Act (PLRA) to make it harder for prisoners to file federal lawsuits aimed at remedying what they believe to be substandard healthcare and unhealthy living conditions.[1] In order to state a case viable to an Eighth Amendment claim, a prisoner must allege "acts or omissions sufficiently harmful to demonstrate deliberate indifference to serious medical needs."

In *Farmer v Brennan* (1994), the Supreme Court clarified that analysis of this standard must be divided into an objective and subjective prong of reasoning. A prison healthcare model that provides care in a manner contrary to current standards of decency sufficiently satisfies the objective prong. According to the Court, medical treatment must be "reasonably commensurate with modern medical science and of a quality acceptable within prudent professional standards, such that any deprivation will deny this "minimal civilized measure" of life's necessities. The subjective prong requires that prison officials "know of and disregard an excessive risk to inmate health or safety." To raise a successful constitutional claim, prisoners must "clearly demonstrate that they have been harmed by a significant medical failure that prison officials were aware of and could have addressed, which could be met if a substantial risk is amply obvious." The objective test requires an assessment of the state of prison health care and a comparison to general population care. The subjective test involves a probing of prison officials' state of mind and degree of awareness.

Conflict of Paradigms

By the mid 1970s, many criminologists as well as public opinion lamented the apparent failure of prisons to serve as rehabilitative agents (Tittle, 1974). Prisons were described as "schools for crime" and institutions increasingly viewed as notorious for their glaring record of "rehabilitative inefficacy" (Tittle, 1974, p. 385). Yet, within this academic and general population milieu, the attitudes of prison administrators, namely wardens, have remained somewhat above the fray maintaining a somewhat nuanced and balanced perspective on the role of prisons. For example, in the 1960s, warden perspectives on the role of prisons were distributed, albeit somewhat unevenly, across the priority attributed to rehabilitation (39%), incapacitation (37%), followed by punishment (22%) (Harris & Associates, 1968). By the 1990s, prison wardens reported slightly higher view of prisons having the primary goal of incapacitation, with rehabilitation, deterrence, and punishment as the lowest ranked option as a potential primary goal of prisons (Cullen, Latessa, Burton, and Lombardo, 1993).

The shift in prison administration philosophy on the role of prisons began in the 1970s, during which time there were more indications in corrections that prisons should be viewed as places of punishment (Morgan, 1992). Those who viewed the role of prisons as punishment embraced the ideology that individuals are not sent to prison for rehabilitative purposes and humanitarian concerns bear less relevance considering the role of prisons. In contrast, those who have viewed the role of prisons as a critical place for human capital enhancement and humanitarian need fulfillment would embrace the ideology that prisons should provide services that help incarcerated become a better person and a productive member of society upon release. Whereas both paradigms have gained credence in popular, academic, and corrections settings, the notion of prisons as a place for punishment/incapacitation---depriving individuals of liberty with less emphasis on the form of treatment provided (Coyle, 2003) has been the remained the prevailing ideology among the elements of the criminal justice system (Osborne, 1995). With these and other variables--court mandates for health care, shifts in popular, academic, and corrections views on the role of prisons--operating as a background for administrative procedures, there is evidence of an ideological bifurcation in the administrative charges of corrections. Taken together, these variables press upon administrators to craft an effective approach to prison management, even when measures of efficaciousness have had a history of being viewed as problematic. On the one hand, some argue that "prisons cannot win acclaim as successes in the rehabilitative endeavor" (Tittle, 1974 p. 393) regardless of adherences to mandates or programming innovations. On the other hand, prisons must be managed efficiently, in accordance with the legal and justifiable expectations of governments and other prison constituents (i.e., society, crime victims, prison staff, prisoners, families of prisoners) (Coyle, 2002). External ideologies view the prison system as part of the criminal justice system and that the goal should be to deter crime. This philosophy views the goal of the prison system to attempt to improve society through the rehabilitation of offenders to live a law-abiding life upon release. Efforts should be made to encourage prisoners to benefit from their time in custody (Morgan, 1992).

The conflict of paradigms creates ideological problems for medical personnel in the treatment of inmates' health issues, especially the aging inmate. The environment of the prison isn't conducive to healthcare management for specific populations, such as the aging. The broader viewpoint is on the population at large. This, combined with an emphasis on security, leaves the aging inmate at a disadvantage in having specific needs being met. This is even more extreme for inmates who require hospice and palliative care. Some may see the terminally ill inmate needing a list of special privileges, something that is not readily accepted among correctional staff (Johnson, 1999). Policies that restrict the control of prescription narcotics, along with med-call procedures, or special diets and attention from kitchen staff can frustrate providers.

There is a clash between two ideologies: humanitarian concerns associated with dying inmates and the concerns of the early release of inmates back into the community. Although overcrowding of prisons, and the healthcare concerns of an aging population, continue to a concern for correctional officials, most are reluctant to accommodate the social concern of releasing prisoners into the community. Advocacy groups (Deitch 2010), such as the National Center for Victims of Crime (Cichowlas & Chen, 2010) oppose possible prisoner release in any form. Therefore, the humanitarian treatment of dying prisoners highlights the need for hospice programs withing correctional settings.

This principle of dual-loyalty places healthcare providers in the prison system in a unique quandary. A working definition is the clinical role conflict between professional duties to a patient and obligations, express or implied, to the interests of a third party, such as an employer, an insurer, or the state (Pont, Stover & Wolff, 2012). This concept places the providers between their patients and prison administration. The classical theories of punishment – retribution, rehabilitation, deterrence, and incapacitation – appear to leave no moral space for addressing the infirmities of age and for offering compassion for the sick and dying, particularly because the exponential increase in the prison population (Johnson, 1999) and vindictive moral sentiments (Rich, 2013) that dominate societal views of offenders have virtually expunged rehabilitation from the pantheon of classical theories. Without such accommodations to management practices, the prevailing culture of rigid security concerns and procedures will remain at odds with important services for the aging such as hospice care for the purposes of compassionate and comfort care for the terminally ill who are incarcerated (Snyder et al., 2009).

Palliative, Hospice, and End-of-Life Care

The contemporary model for hospice care is associated with St. Christopher's Hospice in London (St. Christopher's Hospice, 2011). The vision and mission are to deliver care and support to dying people and stated clearly in the organization's End of Life Care Strategy, which states, "People who are detained in prison, or under the Mental Health Act in secure hospitals, should be treated with dignity and respect and given as much choice as possible about the care they receive as they approach the end of their lives" (p. 103). Although often intertwined, hospice and palliative care are a little different and entail different strategies (Krau, 2016).

Although the standards for both palliative care and hospice have been mutable, most in the medical field agree that each includes specific concepts throughout the patient's journey. One can be considered in palliative care and not be considered for hospice or end-of-life. However, palliative care is part of the end-of-life process. It's more about the timing and progression of the disease. Palliative care involves treatment of individuals who have a serious illness in which a cure or complete reversal of the disease and its process is no longer possible. The focus is on relieving and preventing pain and suffering by controlling symptoms and improving quality of life (Young, 2013, World Health Organization, 2021). Hospice or End-of-Life Care is directed toward the care of one who is nearing the end of life. The treatments are more directed for comfort with a goal to allow the patient to die with dignity. Programs specified to help prisons create and administer palliative care programs in prisons, such as The Hospice Palliative Care Association of South Africa (HPCA) (Carlisle, 2012) and Guiding Responsive Action for Corrections at End of Life (GRACE) (Ratcliff & Craig, 2004), have been very effective at controlling symptoms and improving quality of life (Marti, Hostettler, & Richter, 2017).

End-of-Life treatment processes are more detailed. They focus on care to provide physical, psychological, social, and spiritual care to those with life limited conditions (Stone, Papadopoulos, & Kelly, 2011). Decent end-of-life care in any setting requires a trusting alliance between care providers and the patient (Dubler, 1998). The becomes even more important in the correctional setting. Efforts are made to involve family members, counselors, spiritual leaders in the process, which has a settling and relief effect for inmates, due to the comfortable surroundings (Dubler, 1998).

Palliative and End-of-Life Care in Prisons: A Theoretical Model

Due to social factors beyond their control, including an aging population, longer sentences, closing of mental health facilities, prison officials are regularly boxed into providing care for special populations that would not meet the professional standard of care outside the correctional setting (Teitelbaum & Hoffman, 2013). The rising population of older inmates with long-term and life sentences has burdened the prison system and demanded changes in the administration and creation of programs. Prisons were never designed to be geriatric care facilities, however, some, due to necessity, have established specific units designated for the end-of-life inmate. Changes in the population, especially the aging, demand new learning avenues for staff that include a balance of security and human dignity treatment of older inmates. For example, Williams et al. (2006) reported that 69% of aged inmates received help from other prisoners and only one reported receiving regular help from prison staff. Twenty-eight percent reported receiving no help at all. One wheelchair bound prisoner reported that she regularly missed meals because no one would help her travel to the dining hall (p. 705).

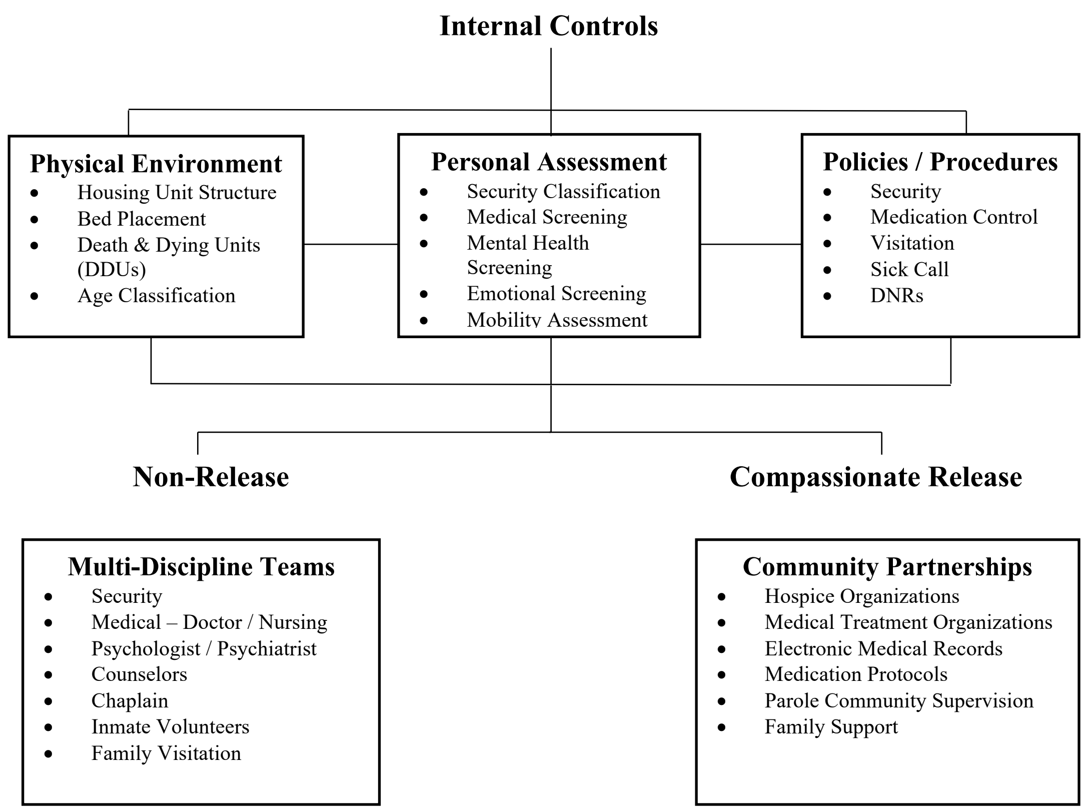
Most concur, that prisons are not healthy places (Moore, 2008) for a plethora of complex reasons (WHO 2007). To begin, prisons and "jails are noisy, chaotic, and violent places" (Kuhlman and Ruddell 2005), and the prevailing conditions of stress and threats to personal wellbeing are unmatched in situations outside the prison walls (Vega and Silverman, 1988). For the elderly inmate, the normal age-related physical and mental health issues are compounded particularly by experiences with high risks for physical assaults, psychological victimization via verbal denigration and taunting (Kerbs and Jolly 2007), each of which impacts health status directly (i.e., elevated rates of blood pressure) and indirectly (i.e., higher stress levels). Last, despite legal mandates, the health resources and procedures in prisons are insufficient, especially for specialty populations such as females (Young and Reviere 2001), those with a disability, chronic mental health issue, or need for hospice and palliative care (Aday 2006).

As the aging inmate population continues to grow, many states have implemented programs specific to aging inmates (Williams et al., 2006) that utilize external partnerships for chronic disease management and use medical students at local universities, although this is nothing new (Clemons, 1994). However, in today's prison environment, what was once referred to simply as 'the aging inmate,' is now a social issue within the confines of the prisons. The culmination of factors now presents the need for hospice and palliative care for inmates who are facing end-of-life.

Many prison models have included a two-pronged approach to the issue (Cichowlas & Chen, 2010): One, an adult care program that takes care of any inmates with mental frailness or physical and two, hospice programs that tries to follow community standards. The importance is the outline of an effective model to help correctional managers navigate the processes of comfort and palliative care for inmates facing end-of-life. Figure 1 outlines a working model for prison officials that will help navigate the processes needed. Most require internal controls, such as the physical environment, personal (inmate) assessment, and policy review. The first section of the model is related to the internal controls within the prison, which are guided by strict policies and procedures. The latter parts of the model are focused on the hospice and palliative treatment alternatives for the end-of-life inmate. Here, the discussion will be focused on the latter two areas of the model.

Figure 1

Theoretical Model of Hospice and Palliative Care Processes



The last section of the model is divided into two sub-sections, which represent the action point of the model. However, the first section, which is divided into three sub-sections represents the analysis of the inmate and his or her circumstances regarding incarceration. For example, an inmate serving a life-sentence would normally not be considered for a compassionate release, thus directing the need for alternative housing and treatment.

In House Programs

To help streamline care and the protocols needed for end-of-life care, many correctional agencies are developing death units (DDUs) to which terminally ill inmates can be transferred at the end of life (Dubler, 1998). This category of inmate creates the need for a variety of actions by prison officials. Effective and thorough communication with medical personnel, including providers, is a critical component of the program. An effective balance between maintaining the security of the prison and providing the standard of required care can be a daunting task for prison officials. In these DDUs, a set of special considerations are utilized to help the end-of-life process be more comfortable for the inmates.

Multi-Discipline Teams

In a non-release situation, multi-discipline teams have been found effective in providing a holistic perspective of an inmate's needs during the end-of-life process. In a content analysis study of the literature on palliative and end-of-life care in prisons, Maschi, Marmo, and Han (2014) (n=49) found common elements of effective practices, which included the use of peer volunteers, multi-disciplinary teams, staff training, and partnerships with community hospice organizations. Obstacles identified included ethical dilemmas based on custody versus care, mistrust between staff and prisoners, safety concerns, concerns over prisoners' misuse of pain medication, institutional staffing, and public apathy toward terminally ill prisoners and their human rights to health in the form of compassionate and palliative care, including the use of compassionate release laws.

Like community hospice programs, a multi-team approach consisting of a variety of professionals is utilized, which includes nurses, physicians, psychologists, psychiatrists, social workers, chaplains, and security officials. A balanced team approach (Norman & Parrish, 1999) is important to address the variety of needs of the inmate (Wright and Bronstein, 2007) and to meet both the physical and emotional guidelines required by the Eighth Amendment. As these interpersonal relationships work together in this setting, issues must be proactively addressed thorough training of all members involved (Senge, 2006), including correctional officer who may struggle in the shift of the paradigm of security to more of a caring-focused role (Stone, Papadoupoulos, & Kelly, 2011).

Partnerships

The aging inmate population, especially those facing end-of-life require specialized attention and treatment. Most needs are beyond the scope of availability in prison medical units. Although community partnerships can be utilized when an inmate is considered and qualifies for compassionate release, the use of partnerships can be effective in DDUs for various aspects of the end-of-life process. Partnerships is an effective alternative to helping provide such specialized care (Norman & Parrish, 1999). Since the needs of terminally ill inmates require specialized treatment, these partnerships become beneficial to the proper care needed and often required, and could be viewed (Ford & Wobeser, 2000) as a cost-saving measure. Additionally, in the event an inmate's status is changed to which compassionate release is granted, these partnerships can help alleviate a break in the continuum of care.

An inmate with a life-threatening or terminal disease may be overwhelmed with a sense of enduring losses (Bolger, 2005), which are cumulative toward internal feelings of regret, devaluation, low self-esteem, and self-concept. Examples include loss of liberty, self-care, family contact, loss of life years, decision-making and loss of control, and human acceptance. Although prisons include counselors, most are very busy with classification of inmates and programming needs for general population. The time required for end-of-life inmates' psychological and emotional health is restrained. Therefore, partnerships with social workers, who can work as liaisons with family members, counselors, psychologists and psychiatrists, can be created to fulfil the needs.

Inmate Volunteer Programs

In many prisons where comfort and palliative care units have been installed, training programs for inmate involvement have been implemented. According to Cichowlas and Chen (2010), inmate volunteers participate in caring for the end-of-life period of ailing inmates and are given relief from regular assigned duties throughout the prison to be with the dying inmate during the time of exiting life. Special relations are formed between the inmate volunteers and dying inmates and those who volunteer express how significant it is for them to be with the dying inmate during the round-the-clock vigil. Prisoners express that the volunteer experience for them is "life-changing," (Cichowlas & Chen) and provided them a way to give back to the community. For some it is a "healing" experience and a source of pride to be able to contribute within the prison walls.

A thorough screening process is performed where coordinators and prison officials utilize sets of reports from housing units and work details to analyze

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responsibility levels. Applications are received and officials select the those qualified and classified appropriately. Intense training is provided along with responsibility, sensitivity, and confidentiality requirements. The quality of training is consistent with that of community standards.

Inmate volunteers must hone skills (Beeler, 2006) specifically needed for working with terminally ill patients. Some would include identifying and enhancing their interpersonal communication skills to include listening, increasing tolerance for various beliefs without judgment, developing the ability to empathize with those who are dying, and managing appropriate self-care.

Due to the prison environment and the unusual programmatic activities of the end-of-life unit, boundaries must be set for the volunteer inmate (Bolger, 2006). Staff must continually be aware of any desire by the inmate to take advantage of the dying inmate. Such measures must include proper classification, security, accountability, and debriefing session that include mechanisms for emotional support, such as regular observation from and discussion with counselors and other mental health professionals. Having a chaplain with a working understanding of the dying process is also important.

Compassionate Release

Compassionate release is rooted in the notion that changed circumstances post-conviction may render a criminal sentence inhumane, excessive, unjust, and, therefore, unwarranted (Jefferson-Bullock, 2015). In other reviews, circumstances regarding an inmate's threat to the community due to health conditions may warrant a review for compassion release.

Requests for compassionate release can be initiated by counselors and/or social workers, physicians, mental health professionals within the prison who have examined the inmate and have determined that he or she is a good candidate. The process, which involves the evaluation of documents, including the sentence and the crime for which the inmate is serving begins. This is an important part of the process since it must be considered due to the threat to the community. If the team considers the inmate eligible, the request is forwarded to the clemency division of the state's department of corrections or parole board.

Compassionate release has several advantages. First, it allows the inmate to spend time with his or her family during the end-of-life process, something that may be beneficial to the psychological and emotional issues. Those who have served long-term sentence have the time with family and friends in the final days of life (Stone, Papadopoulous & Kelly, 2011). Second, since most terminally ill inmates are older, they have access to higher-level healthcare through means of funding, such as Medicare, Medicaid, or ACA. The provisions of more advanced treatments are at disposal. Third, an inmate's release has a positive effect on budget and expenses. According to Michael E. Horowitz, Former U.S. Inspector General (2013), expanding compassionate release can potentially realize cost savings of at least $5.8 billion annualy.[1] Fourth, supervised release is an option that allows the inmate to live in his or her community while being supervised by corrections or parole personnel. The sentence is not vacated, yet the inmate receives supervision accountability. Because the sentence remains active, the inmate can be returned to prison if circumstances arise, such as negative behavior or failure to abide the release conditions.

Conclusions

Data indicates that the prison population is aging. Sentencing guidelines along with more violent crimes has resulted in long sentences. Combined with a lack of prior preventive care, older inmates experience more acute health problems. As they age in prison, these health problem increase resulting in more terminal diseases. Correctional officials continue to be faced with the issues of providing adequate palliative and end-of-life care to inmates. I have provided a model that can be utilized to help officials plan for and implement more aggressive programs to help ease the burden during these times.

[1]Memorandum from the U.S inspector General Michael E. Horowitz for the U.S. Attorney General (December, 11, 2013, re-issued December 20, 2013), available at http://www.justice.gov/oig/challenges/2013.htm (listing the "growing crisis in the federal prison system" as a top management and performance challenge).

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PERSPECTIVES ALONG THE TOURIST-RESIDENT CONTINUUM: THE CASE OF THE MYRTLE BEACH SOUTH CAROLINA AREA

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ABSTRACT

In resort areas first time tourists on short stays can ultimately become permanent migrants. This study hopes to increase understanding of the perceptions of what is good or bad about a destination by tourists and by residents. To learn about how perspectives can vary for residents versus tourists researchers surveyed attendees at performing arts events on the campus of a University located in the Myrtle Beach area of South Carolina, a popular resort destination area on the south Atlantic coast of the United States. The study is important as the transition to resident can have permanent economic impacts.

INTRODUCTION

In resort areas first time tourists on short stays can ultimately become permanent migrants. This study hopes to increase understanding of the perceptions had by resort visitors, and by area residents, of what is good and what is bad about a specific destination. To learn about how perspectives can vary for residents and visitors, researchers surveyed and interviewed attendees at performing arts events on the campus of a University located in the Myrtle Beach area of South Carolina, a popular resort destination area on the south Atlantic coast of the United States.

This study is important because while tourist inject new spending into a destination's economy, that spending provides only a temporary economic boost. The seasonality of tourist spending can also be more extreme in resort destination areas, which tend to be more remote and typically with more extreme weather-related seasonality than do business travel destinations. The retirement phenomenon brings new permanent households that generate consumer spending throughout the year. Consequently, it is in the interest of resort-area governments to do what they can do to encourage the transition of travelers from temporary visitors to permanent residents.

Marketers in the mid-Atlantic and southern United States have long noticed that in-migrants can be repeat visitors initially. Patrick Mason [qtd. in The Washington Times 3] called them "turbo-tourists". Mason points out, "Some people are here 20 times before they retire or buy a second home." In the Carolinas the winter seasonality of these visitors, sometimes referred to as "snowbirds", is characterized by longer lengths of stay, often spanning 1-3 months. How the perception of good or bad characteristics of a community may be different for these long-term visitors versus permanent residents is somewhat less well understood.

The evolution from visitor to permanent resident may involve not only a change in geography but may also be associated with, or precipitated by, a change in social networks. Over the course of a trip, travelers may or may not be overtly seeking information on which to evaluate a resort area as a destination for permanent migration. The social and cultural experiences they have for the better or worse may influence their thinking with respect to the relative quality of life they have in their current place of residence, versus the potential quality of life they might find as a resident in the area they are visiting.

LITERATURE REVIEW

Considerable research focuses on retirement migration. Longino et al. [17] interviewed both stay-in-place retirees in Minnesota and retired migrants from the mid-west in Florida. As with previous studies they found that predominantly factors dealing with climate, person ties, and place issues such as cost of living, taxes, and natural beauty came out as relevant to the decisions to retire in place or to move. Other researchers have further explored the origins of social bonds.

In their study on international retirement migration from the United Kingdom to Spain, Casado-Diaz et al. [2] suggest that communication within social networks gives people a form of social capital. That social capital they contend can be bonding social capital or bridging social capital, the former being derived from family or friends having common geography, the latter being derived from social networks of people with common interests. The authors point out that leisure scholars (4, 5, 16) studied how common leisure interests often facilitate visitation of relatives and friends (VRF travel). The authors' [2] research supported the idea that international retirement migration (IRM) is part of a search for a better quality of life and that ultimately migration reflects perceived satisfaction with their 'new life'… and the importance of "bonding social capital, VFR travel, and communications technologies in helping would-be migrants to mobilize social capital" [137] into new social networks, while maintaining the old ones.

In a study of tourism-induced seasonal retirement migration [7] examines Swedish winter visitors in Spain. The author contends that whether due to negative perceptions, or in search of authenticity, or simply to be charged lower prices, Swedish visitors tried to find a place for themselves somewhere between tourists and resident. It may be that for the traveler or temporary migrant, increasing the number and richness of a social network through common cultural experiences creates bridging social capital that can be a precursor to permanent migration. The travelers' perceived potential for improved quality-of-life in the destination area is of course more complex than the relative amount of social capital that they may perceive.

Quality-of-life is a narrow field of study relatively within the broader topic of social well-being In Uysal et al. [15] the authors provide an extensive review of the literature on quality of life from the perspective or residents in tourist destination areas, and also from the perspective of tourists. The research reviewed on the perspective of residents concluded [51], "First, … tourism development does play a role in community residents' QOL, having both positive and negative dimensions… Second, not all residents perceive tourism impact similarly… and Third, residents' perceptions and attitude toward tourism (and their QOL) tend to differ depending on the level of tourism development with perceived benefits accruing in the earlier stages of tourism development [of the destination]." The authors also summarized literature on QOL from the perspective of tourists [56]. "First, tourism experiences and activities affect tourists' overall QOL…vacation experience appears to have the potential to lead to hedonic and enduring consumption experiences influencing tourists' QOL... hedonic consumptions may have short term effects of tourists' QOL, whereas enduring life changing consumption experiences could have long term effects of QOL. Second the impact of vacation experience on QOL may depend of the life stage…with well-being improving with the amount of trip planning and …the length of stay."

Since the review by Uysal [15] research into QOL has continued, and in particular research into the QOL perceived by residential tourists. Oliveira [10] studied senior residential tourists in golf resorts in Portugal. In this author's research community involvement was not proven to be a significant predictor of QOL improvement for the study group. Nor was frequency and durations of stay. However, it was suggested that both of these outcomes may be related to the homogeneity of the study sample.

METHODOLOGY

One of the first tasks in any social science study is to define the population of subjects to be studied. In this study the researchers are interested in better understanding what perceptions visitors have and what perceptions permanent residents have. Consequently, the first task was to group research participants as either tourist or resident. To that end, attendees waiting in the lobby area of multiple performing arts events were asked by students if they would participate in an interview in return for a ticket to a future show. If agreeing to do so they were asked if the they lived permanently in the Myrtle Beach area for more than 90 days per year, which the researchers chose as the minimum for the participant to be considered residents. This was important as some of the questions for visitors would be different, such as spending patterns, and transportation mode. Munres [qtd. in Rodriguez 55] points out that “in practice, there is a continuum of situations that are difficult to assess quantitatively, so that it is often not ‘possible to determine when somebody must be considered a tourist or a resident.” In resort areas, often first-time travelers can become repeat visitors with stays of increasing length, and eventually become temporary residents (more than 90 days per year) and then permanent resident retirees. What individuals whose travel and residential patterns follow this process of change over time are labeled is at least partially dependent on the researcher’s perspective. For example, Vicente Rodriguez ([14] refers to tourists who bridge the categories of long-term tourist and in-migrant retiree as residential tourists, noting that “they exhibit different patterns of mobile behavior (permanent migration, temporary migration, or simply, mobility) [54]”.

This is a qualitative study which attempts to described perspectives using a thematic approach to analyzing the data [11]. After familiarizing themselves with the data the researchers (faculty) debriefed students that conducted the intercept surveys, and attempted to derive themes from the answers to two questions that were asked of both the residents and the tourists. These were, what is bad about the Myrtle Beach area, and what is good about the Myrtle Beach area? The themes were further vetted by graduate student researchers and faculty prior to creating the word cloud images reported herein based on theme frequencies. But first, in the results section of the paper the researchers report the number of each type of participant, and as an indication of the potential thoroughness of the participants knowledge about of the events, the number of years previously attending similar events on the campus is also described.

The research was conducted during the pre-show waiting period at musical and performing arts events put on at Coastal Carolina University, an institution located in the central-most County (Horry) of the Myrtle Beach metropolitan statistical area (MBMSA) and approximately 10 miles away from the Atlantic Ocean in the MBMSA of (South) Carolina, U.S.A. The research participants who indicated they were visiting the area for periods of between one to 90 days were considered to be tourists. Those attendees that had lived in the area (between 1-25 years) and resided there for more than 90 days per year were considered to be residents.

Researchers were attempting to better understand how guests from the community (residents and tourists) who were attending the University’s performing arts events perceived the events and their community, and in fact participants were a mix of tourists and residents, as defined above. The research was conducted at multiple events during a single semester (fall 2019). In total the voluntary sample consisted of 55 participants, who agreed to complete surveys about their attendee parties. Each party self-chose who among the group would complete the survey. Most of the participants indicated they were not born in the Myrtle Beach area. In fact, only one of the 55 participants (38 residents and 18 tourists) reported that they were born in the area.

RESULTS

The residents were generally knowledgeable about the events. This could at least partially be because none of the residents were first-time attendees at Coastal Carolina University (CCU) performing arts events. The number of years the residents had attended CCU events at least one time is shown below.

Table 1

Number of Years Residents Attended CCU Performing Arts Events

	Years Attending
Maximum	45
Mean	11
Median	6
Mode	3
Sample size	38

Tourists were generally less experienced event attendees, as indicated by the number of years in that they had attended at least one CCU event (Table 2), though even with only 1-4 years of previous experience at the University's events, they too seemed to have good general knowledge about what to expect from their event experience. Importantly, none were attending a CCU event for the first time.

Table 2

Number of Years Tourists Had Attended CCU Performing Arts Events

	Years Attending
Maximum	4
Mean	2
Median	2
Mode	1
Sample size	18

The use of word clouds to show perspective based on frequency of word use has become increasingly popular in qualitative tourism research [6, 8]. The word clouds in Figures 1-4 were created based on interview and survey participant responses to the self-administered survey questions posed during the waiting periods immediately prior to performing arts events held on the campus of Coastal Carolina University. Stop words such as 'is', 'and', and 'the' were removed from participant responses and the frequencies of the terms that appeared are shown below employing Wordle.net software in a similar approach as employed by [6] and [8].

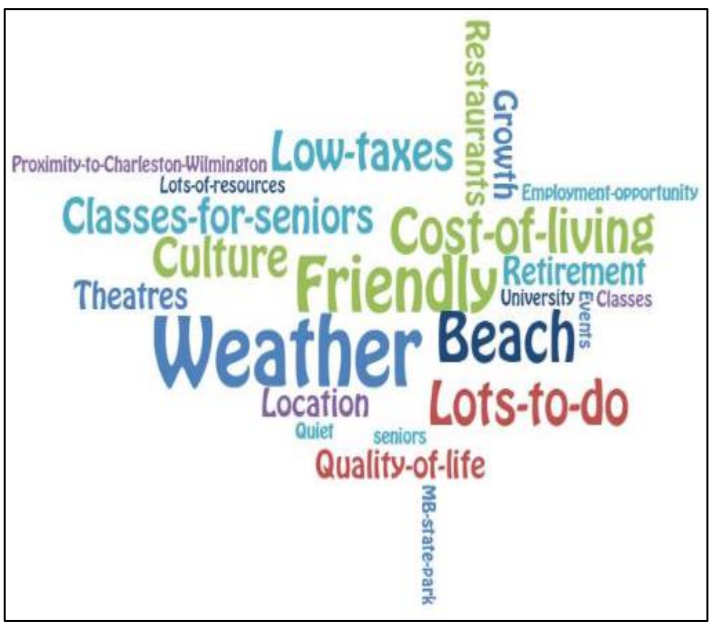
Figure 1

What Myrtle Beach Area Tourists Attending University Performing Arts Events Think is Good About the Myrtle Beach Area (n=18)

Friendly	27.8%
University events	16.7%
Child at CCU	11.1%
Beach	5.6%
Service	5.6%
Heathcare	5.6%
Restaurants	5.6%

Figure 2

What Myrtle Beach Area Residents Attending University Performing Arts Events Think is Good About the Myrtle Beach Area (n=38)



Weather	50.0%
Friendly	23.7%
Beach	15.8%
Culture	10.5%
Lots to do	10.5%
Low taxes	10.5%
Cost of living	7.9%
Growth	5.3%
Quality of life	5.3%
Theatres	5.3%
Restaurants	5.3%
Employment opportunity	2.6%
Events	2.6%
Quiet	2.6%
Lots of resources	2.6%
Classes for seniors	2.6%
Location	2.6%
MB state park	2.6%
Proximity to Charleston-Wilmington	2.6%
University	2.6%

Figure 3

What Myrtle Beach Area Tourists Attending University Performing Arts Events Think is Bad About the Myrtle Beach Area.

Traffic	16.7%
Gun violence	5.6%
Beaches	5.6%
Poorly organized	5.6%
Politics	5.6%

Figure 4

What Myrtle Beach Area Residents Attending University Performing Arts Events Think is Bad About the Myrtle Beach Area (n=38)

Traffic	36.8%
Lacks cultural diversity (in quality arts/restaurants)	13.2%
Crime	7.9%
Storms	7.9%
Pollen	7.9%
Far away from family	5.3%
Slow service	5.3%
Nothing	2.6%
Bike weeks	2.6%
Construction (losing nature)	2.6%
Lacks seasons-mountains	2.6%
Hot weather	2.6%

CONCLUSIONS

Visitors and residents that were interviewed noted some common perspectives. For example, both groups cited the friendly people and lots-to-do as some of their most common likes about the area (Figures 1&2). Both groups cited traffic and crime as dislikes about the area (Figures 3&4). However, some differing issues were top-of-mind for residents versus tourists. For example, for residents weather was the most common good mentioned, and ow taxes frequently came up as well (Figure 2). Visitors mentioned area cultural attractions such as theatres, Brookgreen Gardens, which is an outdoor statue garden and wildlife preserve as likes (Figure 1). A relatively larger number of residents perceived that the area lacks cultural diversity, as represented in its arts and restaurants.

There is a need to better understand the transition that takes place as tourists transition from short term visitor to permanent resident. Anecdotally, many of the residents surveyed in the research reported herein also mentioned that they had at one time visited the Myrtle Beach area as tourists prior to making the decision to move there. Sometimes the transition from visitor to resident was relatively quick, but for some the transition took years or even decades. Learning how their perspectives on what is good and what is bad about the community changed as the visitor moved along what the researchers will call the tourist-resident continuum from short-term visitor, to long-term visitor, to part-time resident to permanent resident changed require longitudinal analysis of individual perspectives. Unfortunately, the in-person interviews of attendees at CCU events had to be cut short owing to the impact of the global pandemic, and the protocols that were put in place in mid-March 2020.

How the perspectives of first-time, short term visitors versus repeat visitors and those with longer lengths of stay, versus residents having recently moved to the area permanently, and residents who have lived in the area for many years, could not be gleaned from the small number of attendees that were studied. Nevertheless, the currently available qualitative research suggests that there is already enough evidence of differing perspectives for the researchers to continue their study when the University can again open its indoor events to visitors the community.

The results reported on herein were retrieved from a self-administered survey. Near the end of the semester in which the surveys were administered to event attendees the researches added a single interview question, which was asked as the respondents submitted their completed surveys. The question was "what should we have asked you, but we did not? A number of the responses led the researchers to conclude that deeper understandings could be gained by using a long-interview approach. Unfortunately, the closure of the University campus to visitors was necessitated shortly after this semester due to a global pandemic.

Nevertheless, one example of a response to the single interview question (discussed below) will become the basis for future long-interviews, that will add a series of more probing questions. This approach to studying the perspectives of in-migrants is a modification of what ethnographic researchers have called the fits-like-a-glove perspective [1] which suggests that behavior is influenced by historical factors which essentially shape thought but are informed by habitus during contemporary experiences in situ. Typically, ethnographic researchers create and analyze short vignettes in which they recount personal interviews or focus groups in an attempt to explain participants' decision making in the context of situational factors. As an example, the interview below occurred as one research participant submitted their completed survey. To protect the identity of neighborhood but to use a name that is descriptive of the fact that the average property value and household spending in this region is more than double that of the county averages, the location of the research participant/in-migrant's home neighborhood will be referred to as 'McMansion Villas'.

Researcher: *Thank you for participating in our survey. May I ask, is there anything else we should have asked you?*

Event attendee: after a pause, *Yes, these events are the reason that we moved to the Myrtle Beach area!*

Researcher: *Interesting, and from where did you move?*

Event attendee: *Maryland.*

Researcher: *Would you mind if I ask where you live now?*

Event attendee: *McMansion Villas. We just moved there last year.*

Researcher: *Fascinating. How did you come to choose the Myrtle Beach area?*

Event attendee: *Approximately four years ago we began looking for a place in which to retire. We visited several communities in Florida. In South Carolina we visited Charleston, and Columbia. A friend back home who is a golfer suggested we should try Myrtle Beach.*

Researcher: *Are you a golfer?*

Event attendee: *No, but we took our friend's advice and visited Myrtle Beach. While in the area we attended the local symphony, and on the way back from the concert we noticed that Coastal Carolina University was here. Back home we often attended performances at the local University so when we saw that CCU was here we knew that there would be opportunities for performing arts entertainment like the one we are attending tonight. That was the final bit of information gained they weekend that we visited that tipped our decision to move to the Myrtle Beach area.*

If one considers that the average home value in the research subject's neighborhood far exceeds the average home value in the surrounding county, it could also be intuitively assumed that the average household spending in that area would likewise far exceed the average household spending in the county. When measuring economic impact, researchers often study participant spending during tourist events, ignoring the impact that the availability the event might have on retirement tourists, those who are, or may be considering migrating to a new area in retirement. To the degree that tourist experiences in situ influence travelers to permanently migrate to the area, the new household spending by an in-migrant so-influenced might be considered to be part of the event's impact on the community. With this in mind the researchers have further refined the surveys for both residents and visitors and are now adding long-interview questions designed to be administered after the initial self-administered survey. The interview accomplished will be the subject of future research papers.

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Prediction of Fetal Health Based on Fetal Heart Rate and Uterine Contractions Using Machine Learning Tools

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Abstract

The most common measurements taken during pregnancy are fetal heart rate (FHR) and uterine contractions (UC). The purpose of this research paper is to determine if supervised machine learning methods can reliably predict the health of a fetus by analyzing the fetal heart rate and uterine contraction data. The dataset used in this research consists of 2126 cases with 21 different features, out of which 1655 were classified as Normal, 295 Suspect, and 176 Pathologic. We conducted a comparison analysis using multiple machine learning algorithms such as decision tree, random forest, support vector machine, k-nearest neighbor, naive Bayes, and multi-layer perceptron. The results indicate that fetal health can reliably be determined by some models; however other models do not perform well at all. The best performance came from the random forest model, which had an accuracy score of 0.937, recall of 0.864, precision of 0.925, and F1 of 0.892. On the other hand, naïve Bayes is the worst model.

PRODUCT HARM CRISIS – CAN FIRM PROMINENCE REDUCE ITS EFFECTS?

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ABSTRACT
Companies are seeing more and more coverage, especially with an increase in social media platforms and usage, of a product-harm crisis (PHC). A product harm crisis is defined as a "discrete, well-publicized occurrence wherein products are found to be defective or dangerous" (Dawar and Pillutla 2000, p. 215). This was previously related to products being recalled, but the definition takes on much broader terms as consumer resistance takes on many forms in today's environment, such as boycotts and online petitions. Companies take great care and resources in PHC prevention, as they are known to have to have negative impacts on both brand preference and advertising effectiveness. These impacts could have lasting consequences, especially for companies with vast product lines that are likely to be more at risk. Firm performance could be hindered through various aspects of a company including new product introductions, strategic alliances, and competition – which are the direct effects in this study. This research proposes a moderating effect of firm prominence on these direct effects. Even though firm prominence is not a new topic across several business disciplines, marketing has yet to utilize this as a predictive construct, therefore this research hopes to add to the scarcity of firm prominence in the marketing literature.

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Revisiting the concept of Lean/Just-in-Time Hiring in a post-COVID 19 unskilled labor environment.

Lean or Just-in-Time Manufacturing has long been established by major manufacturers as an inventory strategy that attempts to reduce costs and waste during the production process. An example of this is receiving raw materials only just as they are needed, which then reduces inventory holding costs, including expensive wait time. Recruiting and hiring practices have adopted this model in recent years and ideally, a rapid reactive hiring process to industry/corporation needs based in large part on technology has become more standard. As staffing needs change, particularly in unskilled labor, hiring managers simply look for suitable candidates in their proverbial internet ether. Societal change post COVID 19 has greatly affected this hiring paradigm. Due to a variety of political, social, and economic forces unskilled labor has become increasingly difficult to come by. Wage stagnation, working conditions, a realization of “big picture” perspectives regarding the essentiality of unskilled labor and other factors has resulted in worker shortage that Lean Hiring has proven unable to effectively facilitate. Companies that maintained a more traditional applicant pool, carefully cultivated over time, have proven more effective at staffing post COVID 19. Smaller companies have realized that wages must be adjusted to the popular “$15” levels, and larger corporations have engaged in more creative/expensive methods: Bank of America has pledged a $25 minimum wage by 2025; Target now offers 100% Tuition and Books coverage at over 40 colleges as a benefit to all workers as a hiring and retention effort. As the labor pool shrinks and evolves, traditional, reliable, relationship-based hiring may soon return to the forefront of hiring practices, replacing the Lean/Just-in-Time models so ubiquitous in the unskilled hiring market.

Predicting the popularity of tweets by analyzing public opinion and emotions related to Covid-19

The study is motivated by the tweets related to Covid-19 with wrong or fake information from beginning of the pandemic to development of vaccines. We analyze almost 2 million tweets on Covid-19 that are written in English to evaluate each tweet's content and to identify public's emotions related to the pandemic from all over the world. We then extract the features and analyzed in each phase of Covid-19 pandemic what were the content of popular tweets. We further applied the advanced machine learning algorithm to generate a predictive model for the retweetability of posted tweets. The results of the study revealed that how public opinions have changed in response to the Covid-19 pandemic from the early stage to the vaccine-related events. Public's dominant emotion toward Covid-19 pandemic by increasing the awareness and WHO responses on the early stages was fear. By distribution of vaccines and Covid-19 control measures turned to joy. Our analysis shows tweets with higher emotional intensity including fear, anger, joy and sadness are more popular based on the number of retweets compared to informative news and information on Covid-19 pandemic. This study can help to identify the negative and misleading information that has an impact on public awareness during pandemics or other crises and recommend the informative and positive sentiment to the social media users such as Twitter.

SUPER-EFFICIENCY DATA ENVELOPMENT ANALYSIS APPROACH TO DISASTER RELIEF SUPPLY CHAIN NETWORK SYSTEM WITH MULTIPLE OBJECTIVES

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ABSTRACT

Disaster relief supply chain (*DRSC*) or humanitarian supply chain (*HSC*) plays a critical role in providing disaster relief items such as first aids, drinking water, food, and daily commodities to alleviate people's suffering. These two terms, *DRSC* and *HSC*, are frequently used interchangeably. This paper studies a multi-objective disaster relief supply chain system model, which would play a critical role in timely disaster relief items. The data envelopment analysis (DEA) method is applied to identify efficient *DRSC* system configurations among the proposed schemes. Super-efficiency data envelopment analysis (SE-DEA) is applied to overcome the weakness of the classical DEA method. The idea of super-efficiency (SE), mainly developed by Anderson and Peterson (1993), is that a decision-making unit (DMU) under evaluation is not included in the reference set of the C-DEA models, and then with its inclusion. Notably, the SE-DEA model has significance for discriminating among efficient DMUs, as Anderson and Peterson (1993) demonstrate. Charnes et al. (1992) use the SE-DEA model to study the sensitivity of the efficiency classification. But the critical issue of using the model is that the adjacent DMUs decide the SE score (SES) of an efficient DMU, so it would be unreasonable for DMUs to be ranked by the SESs. This study presents how to apply SE-DEA methods effectively for designing efficient and robust *DRSCS* configurations. Through a case study, the applicability of the proposed procedure is demonstrated. Using the actual data available for South Carolina, we present the proposed methods to evaluate DRSCS configurations generated by the multiple-objective model. Surprisingly, the proposed methods reveal some hidden efficient network configurations that the regular DEA model alone can't identify. We observe that the proposed approach can be used as an essential tool for designing the DRSC system and other supply chain network systems with multiple inputs and outputs.

SUPPLY CHAIN RISK MANAGEMENT USING AI TECHNOLOGY

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ABSTRACT

This paper draws on existing literature on artificial intelligence for supply chain risk management and resource-based view to conceptualize an analytics model for supply chain re-engineering and supply chain agility. The model is tested based on data collected from small-medium enterprises in which the majority of respondents are executives, managers and senior managers. The significance of the conceptual model is investigated using partial least squares-based structural equation modelling to study the significance of the conceptual model.

THE IMPACT OF THE COVID-INDUCED SHUTDOWN ON LEARNING: THE MEASURABLE EXPERIENCE OF ONE BUSINESS PROGRAM

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ABSTRACT

In March 2020, many colleges and universities quickly transitioned to remote teaching as a result of the COVID-19 pandemic. Instructors scrambled to deliver their courses in any number of methods, from e-mailing topic summaries to their students to developing videos of lectures, either live or in an asynchronous mode. The question of the effectiveness of the instruction that occurred during this disrupted semester has been the subject of numerous anecdotal reports. This study attempts provide an empirical analysis of the teaching effectiveness at one particular institution by comparing the score on the Educational Testing Service's Major Field Test in business taken in 2021 with the past scores.

INTRODUCTION

When the 2020 Spring semester began in January, who in academia would have predicted that the normal pattern of the semester would fall apart in mid-March? After all, the World Health Organization learned that there was an outbreak of a "viral pneumonia" in Wuhan, China, from a media statement from the Wuhan Municipal Health Commission [1]. There was no universal call to arms or realization as to just how pervasive and deadly this virus was to become.

By mid-March, the world was a different place. Quarantines had been enacted, business were closed, and rules for how people would interact were being developed daily. The uncertainly caused shortages to occur in goods that people bought every day. Toilet paper disappeared from the shelves, along with flour and other baking products. People discovered that items that they had never purchased, such as face masks and hand sanitizer, were difficult, if not impossible to find.

College campuses were equally disrupted. Fearing major outbreaks if students returned after Spring Break, many colleges opted to deliver the remainder of the Spring Semester in a non-traditional manner. While many schools had a rich history of delivering courses (and even entire programs) online, other institutions had previously eschewed the use of such technology in course delivery. Their thinking always had been that in-person instruction was best. It is difficult to justify the tuitions charged if students are watching video lectures.

But with the advent of the pandemic, this in-person instruction was no longer a viable option. Instruction had to shift, and shift quickly, to an alternative format. Instructors found it necessary to become somewhat proficient in these remote delivery systems. Institutions often found themselves lacking sufficient software infrastructure and/or technological support to assist in this massive and immediate transformation.

OUR EXPERIENCE

Our institution, the United States Coast Guard Academy, was no different. We are the smallest of the federal service academies at around 1000 cadets (students). We espouse a teaching-centric culture. Classes are generally small (our student-faculty ratio is 7:1), taught in-person and only during the day from 8:00 AM until 4:00 PM. Before March 2020, we might post assignments, homework answers, or short quizzes online, but little else.

The Coast Guard Academy contacted all of the cadets during Spring Break and informed them NOT to return to the Academy. Spring Break was extended for a week to give faculty time to shift to a new mode of instruction. The goal was to complete the semester and graduate the class of 2020 on time. The cadets who were graduating seniors had received their initial billet assignments prior to Spring Break, so the fleet was waiting for them. Suspending the semester was not an option. Since students generally do not go on Spring Break with their academic support materials, the cadets' textbooks, notebooks, and computers were collected (all of our students live on campus) and mailed to them.

Faculty scrambled and discovered multiple ways to deliver their course material. Assignments were modified to accommodate the distance learning. Ultimately, the semester was completed, cadets received course credit, and the seniors graduated. The question of what was actually learned in this disjointed environment was not addressed.

The Management Department at the Coast Guard Academy is in a unique position to access the quality of the learning that actually occurred. Our business program is accredited by AACSB. As part of our annual assessment and continuous improvement, we administer the Major Field Test in Business to each of our majors. We have employed this instrument as a assessment tool since 1996, so we have an historical base of performance for comparison.

The ETS test is a broad-based exam of 120 questions. It covers all of the major aspects of the business discipline. The topics covered and their approximate percentage of the exam are listed below. (Note: The percentages were provided by ETS. They are rough estimates and, as such, do not sum to 100%.)

Accounting	15%
Economics	15%
Management	15%
Quantitative Analysis	11%
Information Systems	10%
Finance	15%
Marketing	15%
Legal & Social Environment	10%

Questions about international business are not considered as a separate category, but rather are covered as they apply in the various business fields above [2].

ETS reports the performance of a business program on their major field test in business as a raw score and also as a percentile. The percentile score shows where your cohort ranks relative to the groups from other schools. If you are in the 70th percentile, your group of students as a whole out-performed 70% of the schools who used the test. The raw score is a measure of the absolute number of correct answers. Both measures are useful, as your raw score may increase while your percentile ranking could decline. This implies that while your students are doing better on the test (an indication that your teaching effectiveness has increased), students at other schools have improved even more than yours.

We generally administer the test in early February. Thus, the Class of 2020 had already taken the test before the COVID disruption in March 2020. However, the Class of 2021 were juniors in the Spring of 2020. Furthermore, that semester, our juniors were taking the business core courses in finance, marketing, operations and project management, as well as a course that combined elements of leadership, organizational development and change. (This is a broad-based course that incorporates many of the elements in a standard introduction to management course.) They had already taken the business core courses in economics, accounting, quantitative analysis, information systems, and business law. Table 1 shows the curriculum for a management major and which semester the courses are generally taken. (There are some exceptions, but the cadets move through the courses with the cohort that they entered the Academy with.)

We also take advantage of the 30-question practice test supplied by ETS. This gives the students examples of what to expect in the actual test later on. After the practice, we review the test with the cadets, incorporating a quick review of the various disciplines. Our students find the review helpful, as most took their first economics course as a freshman.

RESULTS

Table 2 shows how our cadets have performed on the ETS major field test in business over time. The results from 2021 showed an 11 percentage point decrease over the average of the previous 25 years. However, the declines were not uniform across all of the test areas. In fact, the cadets performed better than average in three areas, accounting, management, and finance, although the increases are small. Two of the decreases were also slight. Quantitative analysis and marketing both experienced a 6 percentage point decline. Larger declines were seen in the other areas. Economics, as well as legal and social environment, each declined by 11 percentage points. International issues fell by 29 percentage points and information systems declined by 44 percentage points from the average.

As stated earlier, the business courses most impacted by the COVID disruption for this class were marketing, finance, and operations and project management. The cadets' performance in finance was essentially unchanged (a 1 percentage point difference). Marketing saw a 6 percentage point decrease, but that difference is not significant at the 5% level. The operations and project management course has applications in management and quantitative analysis. Management majors improved relative to the average while quantitative analysis was lower than the average by the same amount, but only the difference in quantitative analysis was statistically significant.

IMPLICATIONS

The impetus for this study was to ascertain the effect that the COVID disruption (and subsequent shift to remote instruction) had on teaching effectiveness and student learning. We were not surprised to see that the scores declined. However, we were surprised to see the declines in areas not effected by the COVID disruption, those areas that delivered the core business courses during Spring 2020, namely, marketing and finance. These two areas did not show significant differences from the historical average performance.

If the transition at Spring Break to remote instruction for this class of cadets did not adversely affect teaching effectiveness and learning, why then did the ETS area scores decline so significantly? What was so different about the Class of 2021 from there predecessors to cause such a decline? We propose two unrelated possible explanations. First, the Class of 2021 was larger than normal. This put a strain on instructional resources at every point in their program. With more students than normal, it is not unreasonable to assume that the level of learning for some students is lower than before. Larger class sizes make it more difficult to ensure that every student comprehends the concepts presented.

Table 1 shows the ETS scores for the various class years. The class cohorts are comprised of two distinct subpopulations. Many of the cohort either selected management as their major as part of their initial application to the Coast Guard Academy or changed their major to management early in their academic career. The remainder of the cohort are those non-management majors that did not perform well enough to remain in the initial major of choice. Cadets are generally required to complete their degree in four years. (Extensions are rarely given, but that number is in the single digits each year. According to the Office of Institutional Research at the US Coast Guard Academy, for the graduating classes from 2017-2021, over 98% of our graduates graduated in four years.) While most of these students perform well in their new major, others are less enthused by the change. They remain in the management major because they want to be a Coast Guard officer, and an undergraduate degree is required to be commissioned as an officer.

A second difference is that we had our students take the ETS test electronically. Previously, we had used the paper version. Could it be that if students were taking the paper version, they would already have a pencil in their hand, making it easier to perform a calculation required for the answer? However, if their fingers were on the keyboard and poised to click on an answer, perhaps these calculations were performed in their heads erroneously or not made at all.

We contacted the Educational Testing Service representative with this question in mind: Do scores decline when the test is administered electronically vs on paper. They reported that their analysis did not find a significant difference in the test results based on how the test was administered. It would not surprise me that this is the case for students at large universities, where they are exposed to electronic tests in numerous classes. However, it may not be true for small institutions that test using a more traditional format.

CONCLUSIONS

It is difficult to ascertain the causes of a one-year aberration in test performance. The decline that we experienced certainly justifies looking for the cause. This will be a continual area that will require attention for the next few years. However, in a few years, the only people associated with the management major who directly experienced the COVID disruption of 2020 will be the faculty members.

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TABLE 1

CADET:_________________________

MANAGEMENT – General Plan of Study Class of 2021

	Fall Semester		**G**	**Complete**		**Spring Semester**		**G**	**Complete**
	4/c Year	*Credits*					*Credits*		
2111	College Composition*	3.00			0901	History of the USCG*	1.00		
2263	American Government	3.00			213X	Cultural Perspectives*	3.00		
3111	Calculus I	4.00			2142	Comp Problem Solving	3.00		
4102	Prin Fitness/Wellness I	1.00			3213	Probability & Statistics	3.00		
4111	Swimming I	0.25			4103	Personal Defense I	0.25		
5102	Chemistry I	4.00			4112	Prin Fitness/Wellness II	1.00		
6101	Fund of Navigation	3.00			5162	Physics I	4.00		
					8115	Macroeconomic Prin*	3.00		
	Third Class Year	*Credits*					*Credits*		
4204	Lifetime Sports I: RQB	0.25			7310	Intro to Cyber Tech	1.50		
4214	Lifetime Sports II: Golf	0.25			2393	Morals and Ethics**	3.00		
52X6	Lab Science**	4.00			8331	Management Info Sys	3.30		
6201	Ships & Maritime Sys	3.00			4222	Professional Rescuer	2.00		
6202	Apps in Nav Lab	1.00			5444	Atmospheric & Mar Sci	1.50		
8201	Intro to Business	3.00			8246	Financial Accounting	3.00		
8211	Org Behavior & Ldrshp	3.00			8241	Legal Environ Bus	3.00		
8217	Microeconomic Prin	3.00							
	Second Class Year	*Credits*					*Credits*		
6301	Maritime Watch Officer	4.00			4303	Personal Defense II	0.25		
2398	Law	4.00			4304	Lifetime Sports III: Tennis	0.25		
8348	Managerial Accounting	3.00			8342	Marketing	3.00		
8351	Research Methods	3.00			8349	Financial Management	3.00		
8357	Human Resources Mgmt	3.00			8363	Ops & Project Mgmt	3.00		
					8366	Ldrshp/Org Dev/Change	3.00		
					____	Major Area Elective	3.0-4.0		
	First Class Year	*Credits*					*Credits*		
6401	SelTop 100 Ton Master	3.00			2485	Global Studies	3.00		
6402	SelTop 100 Ton Lab	1.00			8445	Public Mgmt Consulting	3.00		
8443	Strategic Management	3.00			____	Major Area Elective	3.0-4.0		
8444	PMC Prep	1.00			____	Major Area Elective	3.0-4.0		
____	Major Area Elective	3.0-4.0			____	Free Elective	3.0-4.0		
____	Major Area Elective	3.0-4.0			____	Physical Education	Note		
____	Free Elective	3.0-4.0							
	Physical Education	0.50							

* These courses may be scheduled during the fall or spring semester.

** These courses may be scheduled during fall or spring semester.

TABLE 2

Class year	Overall score	Acc'ting	Econ	Mgnt	Quant analysis	Finance	Marketing	Legal & Soc env	Int'l issues	Info systems
1996	99%	96%	97%	99%	99%	98%	86%	89%	66%	
1997	96%	85%	90%	98%	99%	79%	84%	96%	57%	
1998	97%	83%	96%	96%	99%	98%	74%	94%	37%	
1999	99%	99%	95%	98%	99%	98%	90%	86%	37%	
2000	96%	90%	96%	99%	99%	89%	59%	71%	35%	
2001	99%	90%	98%	98%	99%	98%	90%	86%	71%	
2002	97%	85%	99%	98%	99%	97%	81%	99%	86%	
2003	90%	80%	90%	90%	95%	85%	20%	60%	90%	
2004	93%	85%	90%	60%	95%	95%	70%	85%	80%	
2005	85%	65%	85%	80%	95%	85%	50%	85%	85%	
2006	85%	60%	95%	55%	95%	95%	45%	90%	65%	
2007	55%	20%	85%	70%	85%	70%	50%	15%	60%	65%
2008	70%	25%	85%	50%	85%	80%	75%	50%	65%	85%
2009	80%	30%	95%	85%	95%	70%	95%	50%	65%	80%
2010	75%	55%	80%	35%	75%	55%	60%	25%	35%	95%
2011	95%	80%	65%	95%	75%	60%	95%	95%	90%	90%
2012	89%	87%	69%	88%	90%	87%	89%	76%	88%	88%
2013	85%	80%	90%	90%	67%	74%	79%	52%	91%	90%
2014	91%	91%	78%	89%	97%	76%	93%	88%	87%	96%
2015	94%	96%	84%	79%	95%	80%	92%	85%	85%	73%
2016	89%	79%	82%	84%	98%	76%	73%	97%	49%	92%
2017	98%	90%	97%	99%	99%	91%	35%	31%	83%	95%
2018	89%	82%	92%	75%	88%	80%	78%	97%	35%	93%
2019	92%	87%	92%	92%	88%	44%	94%	96%	79%	96%
2020	93%	94%	93%	61%	97%	77%	92%	99%	67%	64%
Mean	89%	77%	89%	83%	92%	81%	74%	76%	68%	86%
Std dev	10%	22%	9%	18%	9%	14%	20%	24%	19%	11%
2021	78%	82%	78%	87%	86%	82%	68%	65%	39%	42%

THE IMPACT OF VIRTUAL EXPERIENCE ON ACADEMIC EXPERIENCE

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ABSTRACT

This study examines the impact of college students' smartphone use on their academic experience. Applying the attachment theory, we examine the effect of students' attachment with their smartphones on their academic performance, academic persistence, and social wellbeing. Current research on smartphone usage have generally focused on problematic smartphone overuse, compulsive usage, or smartphone addiction from a clinical perspective. Our study introduces attachment theory to understand the smartphone behavior from a theoretical lens.

Although attachment theory has traditionally been applied to understand the bonding relationships between humans, the theory has since been applied to study relationships between human and objects such as shoes, purses or stuffed animals. This theoretical extension helps understand the individuals' relationships with their smartphones.

Ainsworth (1985) described four key features that appear in attachment relationships. They are (1) proximity maintenance, (2) attachment target as a safe haven, (3) attachment target promotes confidence and (4) separation anxiety when parting with the attachment. These attachment characteristics provide a basis to explore the attachment relationships between human and objects such as smartphone.

We preliminarily operationalize this construct as time spent on using the smartphone. The more time an individual uses the smartphone, the more attachment or connectivity is established between the users and the smartphone. By investigating the extent of time an individual uses the smartphone, we can also understand the degree of attachment an individual demonstrates with his or her smartphone and its impacts.

Our research explores the impact of college students' use of smartphone on various online apps on their academic performance, academic persistence and social well beings. Our three hypotheses are: The more time an individual spends on the smartphone, (1) the higher their academic performance; (2) the stronger their academic persistence and (3) the better social well beings

Our preliminary results show support of our hypotheses.

THE INFLUENCE OF CENTRAL BANK BEHAVIOR ON US INTEREST RATES: REVISITED

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I. ABSTRACT

Our study has two goals. First, we will attempt to quantify the effect of the Fed's 2020 Quantitative Easing program on US Treasury yields. Second, we will assess the influence of foreign investors on US interest rates. We find that: 1) the Fed's Covid QE programs had a significant effect on US long-term yields, and 2) foreign investors have an important influence on US interest rates.

II. INTRODUCTION

First, a brief description of the demand for marketable US Treasury debt over roughly the last 30 years. The share of US Treasury debt held by foreign investors, central banks and private investors combined, has moved substantially during the past 30 years. The share of marketable Treasury debt held by all foreign investors moved in a range of 18% to 20% during the 1989-1994 period. The share increased to 52% during the fourth quarter of 2008, before declining to 47% at the end of 2013. At the end of 2017 the share was 43%, and then it declined slightly to 40% by the end of 2019.

During the Covid period, the share of Treasury marketable debt held by non-US investors has declined further to just 33% at the end of the 2021Q1. Who made up for the relative decline in non-US holdings of Treasury securities? The Fed, of course. It held 15% of total marketable debt at the end of 2019, and then this share increase to 25% at the end of 2020, and remained at that level through the first quarter of 2021.

The private US sectors whose shares of Treasury marketable debt outstanding have increased since the end of 2019 include US chartered depository institutions and exchange traded bond funds. But, the private sector with the largest increase in its share of marketable Treasury debt was Money Market Mutual Funds, whose share roughly doubled to 11%. This increase in MMMF holdings was, not surprisingly, due to a tripling of this sector's Treasury bill holdings.

Financial market analysts have for years focused on the vulnerability of US financial markets to any slowing in the pace of foreign demand. Their fear is that real interest rates would increase, boosting nominal US interest rates even if the rate of inflation is low. US Federal budget deficits and the increasing use of the euro as a reserve currency could cause foreign investors to become less willing to lend the Treasury funds. Many analysts believe that the US current account deficit has been easily funded by a strong demand for dollar-denominated assets. Their concern is that the price at which the current account deficit is financed can increase. The result would be a slower trend in US economic growth.

However, some former Federal Reserve chairmen argue that the US dependence on foreign investment is not a threat to long-term economic growth in the US. They have attributed low US long-term interest rates to a "global savings glut," which they believe helped reduce real long-term interest rates. This savings glut, in their opinion, helped finance the accelerating US private sector demand for credit, which ended with the mortgage crisis. In their view, a strong ex-ante foreign demand for dollar-denominated assets has contributed to the US current account deficit.

III. PLAN OF STUDY

This study will try to quantify the effects of increased foreign investment on the level of US interest rates, and it will attempt to answer some questions that are relevant to the Fed's response to the Covid crisis. Our estimation will cover the period from 1980 through the end of 2019.

The Fed seems likely to begin "tapering" its purchases of Treasuries and MBS, perhaps as soon as the end of 2021, and it possible that its holdings of all forms of marketable will eventually decline. What can we say about US interest rates when these events unfold?

The basic outline of this research follows the paper by Winder (2014).

IV. THE BASIC INTEREST RATE MODEL

Our first equation attempts to explain Treasury yields as a function of Treasury supply, Treasury demand, and several control variables that capture the forces of the global business cycle.

A general form of this equation might look like:

$$\text{Treasury Yield} = \beta_0 + \beta_1 (\text{CommB/Treas}) + \beta_2 (\text{Fed/Treas}) + \beta_3 (\text{ROW/Treas}) + \beta_4 (\text{HH/Treas}) + \beta_{5\ldots 23} (\text{Other Sectors/Treas}) + \beta_{24\ldots n} (\text{Control Variables}). \quad [1]$$

Yield = Treasury constant maturity series for 6-month and 10-year maturities.
Expected Inflation = A distributed lag on the US consumer price inflation, all urban consumers.
CommB = Commercial bank holdings of marketable Treasury securities.
Treas = The stock of marketable US Treasury debt outstanding.
Fed = Federal Reserve holdings of marketable Treasury debt.
ROW = "Rest of the World" sector holdings of marketable Treasury debt.
HH = Household holdings of marketable Treasury securities.
Other Sectors = All other sectors that hold marketable Treasury debt.
Control Variables = Variables that capture inflation expectations, global real economic growth, and global savings.

Our analysis will assess the influence on US Treasury yields of all sectors that hold Treasury obligations. If the coefficient on a ratio variable, for example (ROW/Treas), is statistically significant and negative, then we can conclude that an increase in the share of Treasury debt held by that sector contributes to a decline in nominal yields and, also, real Treasury yields for a given expected inflation rate. If the coefficient on a ratio variable, for example (HH/Treas), is statistically significant and positive, then we can conclude that an increase in interest rates will likely lead to an increase in holdings of Treasury debt by that sector. In our analysis, ROW/Treas is negative and significant using the model above. Also, HH/Treas is positive and significant in our analysis. That is, higher interest rates attract small investors into fixed income markets. We will focus on the sectors which have significant negative coefficients.

V. DISCUSSION OF THE MODEL

The Control Variables (CV) are business cycle indicators. The first CV is expected inflation. Many representations of inflation expectations were tried using the US CPI-U index as the basis for measurement. The object was to find an expectations indicator whose coefficient was close to 1.0, so that if the expected rate of inflation increases by 1 percentage point, then nominal interest rates would also rise by 1 percentage point.

We tried several lag structures on CPI inflation as expectations proxies. We used year-over-year CPI inflation and averages of recent years as expectations variables. We also tried what might be called "perfect foresight" expectations variables. Here we used actual inflation over 1-, 2-, and 3-year forward horizons.

Despite considerable testing, there was no measure of expected inflation that produced the desired coefficient of 1.0. Often, the coefficient on expected inflation, however measured, was around 0.5. We settled on a distributed lag on actual past inflation with the arbitrary weights of 0.4, 0.3, 0.2, and 0.1. That is, expected inflation is a function of past inflation, and more weight is given to more recent observations.

The second CV is a savings variable. There are various opinions about why US interest rates have been so low for so long, going back before the Great Recession. One view says US monetary policy has been too easy. Many in Congress believe this. But Fed officials, as noted earlier, believe there has been a savings glut outside the US, especially in Asia. Savings rates were tested across regions and groups of countries. Savings rate, as explanatory variables, were tested for the World, Asia, the European Union, Latin America, and the G-6. The savings rate for Asia clearly had the strongest influence on US interest rates, across a wide group of models and interest rates.

The third CV is a measure of the real demand for funds. As the expansionary phase of a business cycle strengthens, the real demand for credit increases, and so should real interest rates. That is, real growth, given stable price expectations, should lead to higher real and nominal interest rates. Here the obvious choice was world real GDP growth as measured by the IMF in the WEO database.

A final control variable, a "term-structure" variable, was added to regressions when the dependent variable was the 10-year yield. The term structure was represented by the 6-month Treasury bill yield. Interestingly, the 6-month Treasury bill yield did not improve the quality of the estimated equations. All it did for the 3-year and 10-year yield equation was to lower the coefficient on expected inflation, such that the sum of the two coefficients roughly equaled the coefficient on expected inflation when there was no short-term interest rate as a regressor.

The statistical relationships were strongest when the 10-year Treasury yield was the dependent variable and weakest when the 6-month Treasury bill yield was the dependent variable. This was true across a wide group of models.

The final set of control variables comprised: inflation expectations as previously defined, the savings rate for Asia, and world real GDP growth.

The relationship between sector holdings of Treasuries and interest rates was tested for each of the 23 sectors in the Federal Reserve's Flow of Funds Accounts using the following model.

$$T10Y = \beta_0 + \beta_1 (HLD_i/Treas) + \beta_2 (CPIEXP) + \beta_3 (ASR) + \beta_4 (WRGDP) \qquad [2]$$

T10Y = US Treasury constant maturity 10-year yield.
HLD_i = Treasury holdings of sector i, ideally using note and bond holdings if available.
Treas= Marketable Treasury debt outstanding.
CPIEXP = Expected inflation as defined above.
ASR = Asia savings rate as measured in the IMF WEO database.
WRGDP = World real GDP growth as measured in the IMF WEO database.

Ideally, the goal is to estimate a multi-sector equation similar to Equation 1 that has all the sectors for which the beta coefficients of Equation 1 are negative and statistically significant. That is, when the share of Treasury debt held by a sector increases, interest rates decline. If a coefficient in Equation 2 is positive, then it can be inferred that the behavior of a sector responds to changes in interest rates, rather than the behavior of that sector helps determine interest rates.

Using Equation 2 as our basic conceptual model, we tested all 23 sectors from the Fed's Treasury securities table. The sectors that have negative and significant coefficients for β_1 are:

a.) Treasury note and bond holdings of the Rest of the World (ROW),
b.) Treasury note and bond holdings of the Federal Reserve and total Treasury debt held by the Fed,
c.) Treasury note and bond holdings of US mutual funds and ETFs.

VI. THE EMPIRICAL RESULTS

Equation 1 from Table 1 presents the results including all the Flow of Funds sectors that have a significant negative sign for β.

See Table 1 below.

We can interpret the sensitivity of long-term Treasury yields to changes in Flow of Funds sector holdings easily. The supply of marketable Treasury debt was $21 trillion at the end of 2020. A 1 percentage point increase in Fed holdings of Treasuries, an increase of $210 billion, leads to an approximate 10 basis point decline in long-term Treasury yields. For the Rest of the World (ROW) a similar increase in the share of Treasury debt held leads to about an 8 basis point in the 10-year Treasury yield. The coefficients on Asian savings and world real GDP growth have the expected signs and are significant, but the effect on US interest rates is small.

Equation 1 has a DW statistic of 1.70. The upper and lower bounds computed by Savin and White at a 1% confidence interval for an equation with seven explanatory variables and 40 observations are 1.854 and 1.175. We cannot reject the null hypothesis that there is no positive first-order correlation, while the test for negative correlation is inconclusive. As a result of these tests, we added an AR(1) term to our basic regression. See the results provided in Table 2 below. The general profile of estimated coefficients is close to the results of Equation 1.

VII. SIMULATING THE EFFECTS OF FED BUYING IN THE COVID ERA ON LONG-TERM US INTEREST RATES

Assumptions for Simulating Model

a.) We assume that world real GDP growth follows the IMF's World Economic Outlook for 2021 and 2022, that is +6.0% for this year and 4.5% for next year. Beyond the IMF forecasts, the author has assumed +3.5% for calendar years 2023 through 2025.

b.) Congressional Budget Office (CBO) forecasts are used for calendar years 2021 through 2025. (We recognize that CBO budget forecasts are for fiscal years.)

c.) Our analysis assumes that the share of mutual bond fund plus ETF bond fund holdings of Treasury notes and bonds is maintained at its recent trend level of 7.5%.

d.) The Asian savings rate is maintained at its recent trend rate of 30%.

e.) We assume that the core CPI inflation is +3.5% in 2021, +3.25% in 2022, +3.0% in 2023, and +2.5% in both 2024 and 2025. Essentially, we believe current Fed policymakers that the current high inflation rate is temporary.

f.) Finally, we assume that the ratio of ROW Treasury note and bond holdings rebounds from its recent low of 29% back to 33% by the end of 2025. Treasury yields remain attractive to those of many developed countries.

If we assume that the share of Treasury debt held by the Fed stays at 25%, then we can construct the following forecast of the UST 10-year yield, which is presented in column 2 of table 3B below. The third column presents a 10-year yield forecast assuming a gradual taper to 20% of marketable debt by the end of 2025. We assume a 24% share held by the Fed in 2021, which declines 1 percentage point per year through 2025.

Table 3A: UST 10-year Forecast

	Forecast	Actual
2019	1.66%	2.14%
2020	0.82%	0.89%

The model was estimated through 2019. The forecasted 10-year rate for 2020 uses the actual values of the independent variables in the model.

Table 3B: UST 10-year Forecast

	Assuming FRB 25%	Assuming FRB Taper to 20%	Difference
2021	3.05%	3.15%	+10 bp
2022	2.85%	3.06%	+21 bp
2023	2.49%	2.80%	+31bp
2024	2.35%	2.75%	+40 bp
2025	2.17%	2.67%	+50bp.

The results presented point to the following “rule of thumb”: For every 5 percentage points of decline in the Fed’s share of marketable Treasury debt, longer-term US sovereign yields increase 50 bp.

Let’s put this result in the context of the Fed’s Quantitative Easing response to the Covid pandemic. The Fed’s share of marketable Treasury debt outstanding increased from 15% at the end of 2019 to 25% by the end of 2020. The share was maintained at about 25% during the first quarter of 2021. Our simulation results suggest that Fed balance sheet expansion reduced the Treasury 10-year yield about 100 basis points from where it otherwise would be.

VIII. CONCLUSIONS

1.) Federal Reserve buying of Treasuries during the Covid pandemic has had a meaningful effect on long-term US sovereign interest rates. Fed tapering will need to be gradual, so that economic activity is not suddenly disrupted.

2.) Foreign investors, both central banks and private sector asset managers, still have a strong preference for US Treasuries.

3.) Asian investors in particular, most likely central banks investing the national savings generated by trade surpluses, still invest heavily in Treasuries.

4.) Global real economic growth has a significant, but modest effect on long-term US interest rates.

5.) All these results are similar to our study that was presented at the 2014 SEINFORMS conference.

7

Table 1

Determinants of the US Treasury 10-Year Yield

1980-2019

	C	CPIEXP	ROW	Fed	Mutual Funds +ETFs	Asia Savings	World Real GDP Growth	Adjusted R^2	F Test	DW
Equation 1										
gs10	13.38	0.44	-8.28	-10.13	-52.09	-0.14	0.24	0.95	112.08	1.70
t-statistic	7.96	4.83	-3.45	-2.03	-5.34	-2.17	2.06			

gs10	US Treasury constant-maturity 10-year yield.
CPIEXP	0.4*CPIYOY+0.3*CPIYOY(-1)+0.2*CPIYOY(-2)+0.1*CPIYOY(-3).
CPIYOY	Year-over-year percent change in the core CPI, all urban.
ROW	Non-US sector holdings of UST notes & bonds as a percent of marketable debt outstanding.
Fed	FRB holdings of US Treasury debt as a percent of marketable debt outstanding.
Mutual Funds +ETFs	US mutual fund + ETF holdings of UST notes and bonds as a percent of marketable debt outstanding.
Asia Savings	Gross national savings as a percent of GDP for Asia from IMF WEO database.
World Real GDP Growth	Annual world real GDP growth rate from IMF WEO database.

Table 2

Determinants of the US Treasury 10-Year Yield

1980-2019

	C	CPIEXP	ROW + Fed	Mutual Funds +ETFs	Asia Savings	World Real GDP Growth	AR(1)		Adjusted R^2	F Test	DW
Equation 2											
gs10	12.12	0.59	-6.50	-48.31	-0.16	0.18	0.38		0.96	144.49	2.18
t-statistic	8.05	3.86	-3.64	-4.20	-2.62	1.80	2.47				

gs10	US Treasury constant-maturity 10-year yield.
CPIEXP	0.4*CPIYOY+0.3*CPIYOY(-1)+0.2*CPIYOY(-2)+0.1*CPIYOY(-3).
CPIYOY	Year-over-year percent change in the core CPI, all urban.
ROW	Non-US sector holdings of UST notes & bonds as a percent of marketable debt outstanding.
Fed	FRB holdings of US Treasury debt as a percent of marketable debt outstanding.
Mutual Funds +ETFs	US mutual fund + ETF holdings of UST notes and bonds as a percent of marketable debt outstanding.
Asia Savings	Gross national savings as a percent of GDP for Asia from IMF WEO database.
World Real GDP Growth	Annual world real GDP growth rate from IMF WEO database.

IX. REFERENCES

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THE POTENTIAL IMPACT TO ENTREPRENEURIAL ACTIVITY DUE TO THE COVID-19 PANDEMIC

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ABSTRACT

COVID-19 had a terribly detrimental impact on the global economy, and unemployment in the United States rose sharply as a result. This paper attempts to provide insight into the potential for an increase in entrepreneurial activity due to the currently high levels of unemployment, and looks into the potential impacts to new business applications, based on current governmental policies, such as supplemental federal unemployment benefits paid to the unemployed. Further, several different research studies on the entrepreneurial initiatives that took place in the wake of the Great Recession and the Great Depression are analyzed and discussed to determine if entrepreneurial activities may be primed to increase. Findings suggest that the overall number of small businesses is likely to decline in the face of the COVID-19 crisis due to the unfavorable economic conditions, but new “necessity” entrepreneurs are likely to be on the rise. Entrepreneurial educational opportunities are suggested in an effort to aid these new entrepreneurs to achieve success.

INTRODUCTION

The world has changed in the wake of the COVID-19 pandemic, which began to make its impact on most American businesses in approximately March of 2020. The coronavirus is a human tragedy with global implications, and (as of this writing) the situation is still evolving. Regardless, the coronavirus outbreak has completely altered the daily lives of people across the country, and many of these alterations have forced businesses to change their methodologies substantially in order to remain operational. Unfortunately, not every business is able to adapt successfully, and the impact that the pandemic has had on business success has been disturbing. At the apex of the crisis in April 2020, layoffs, furloughs, and closures brought the nation’s unemployment rate to 14.7%. In order to provide perspective, this extreme level of unemployment compared abysmally to the 10% unemployment rate associated with the Great Recession of 2009, yet is still remarkably better than the unemployment rate during the Great Depression, which was 24.9% (the highest level in modern history).

With so many unemployed, is it possible that workers may begin to consider starting new businesses? Could an increase in entrepreneurship be a dim silver lining to this global tragedy? This paper attempts to use data and information from the Great Recession and the Great Depression to predict entrepreneurial activity in the wake of the global pandemic of 2020. What governmental policies were enacted to curb unemployment and what peripheral affects did they have on new business formation? Is it possible that interventionist policies enacted by the government during the current COVID pandemic, which are intended to aid owners and laid-off workers, are having the effect of delaying "necessity" entrepreneurs from feeling the pressure to start a new business? Are working family members who may have been considering starting a business of their own actually being disincentivized from exploring new entrepreneurial efforts by the enhanced childcare and unemployment benefits being paid to stay at home?

Further developments during 2020 and 2021, such as COVID relief monies available for start-ups, and the impact of supplemental unemployment benefits offered by the federal government to augment state unemployment benefits may add to the increase or decline of new start-up ventures. As 2021 moves forward, some states are deciding to forgo these additional benefits in the hopes of stimulating employment in their own states. This tends to be breaking down along political lines; the traditional red state - blue state divide. How this impacts more "necessity" start-ups once the supplemental federal unemployment benefits run out lends itself to more research.

This paper therefore, also looks at the impact of that legislation on new business applications and how that might impact entrepreneurial activity going forward. Will the additional stimulus further delay the pressure on those who are unemployed from becoming necessity entrepreneurs? Could the additional stimulus payments actually work against the economy by limiting new start-up entrepreneurs? Are states that have decided to forgo additional federal unemployment bonuses of $300 per week on top of any state payouts seeing a rise in new business formation in comparison to those states who have opted to continue these payouts for its citizens?

DISCUSSION

In recessionary economic scenarios, when unemployment is high, there are two basic, yet conflicting, theories that relate to entrepreneurial activity. The first theory suggests that unemployed workers are pushed into self-employment due to the weak labor market (Constant & Zimmerman, 2004; Evans & Leighton, 1989). This theory suggests a surge in entrepreneurial activity will take place in the wake of the coronavirus, if for no other reason than people have limited options to do otherwise. However, there is a conflicting viewpoint offered by other research that suggests that entrepreneurial activity may decline in the face of the pandemic, as the economic conditions necessary for successful entrepreneurial activity are at a low point.

Reduced Demand

From an economic standpoint, it is logical to suggest that any increased individual desire to engage in entrepreneurial activity is more than offset by the negative impact of reduced demand on goods and services. In specific research conducted by Blanchflower (2000), it was found that countries with high unemployment tended to rate lower than average on a self-employment scale, perhaps due to the negative economic influences. Further, Shane (2011) states that the Great Recession had an overall negative impact on U.S. entrepreneurship. While he states that new cases of self-employment did increase over the time period, data from the Bureau of Labor Statistics suggest that there were far fewer self-employed individuals after the Great Recession than before the crisis began. This suggests that the exodus from self-employment must have been greater than the entry into it.

Necessity Entrepreneurs

In contrast to the theory that the coronavirus will have a detrimental impact on entrepreneurial activity is the idea that entrepreneurial efforts will increase in the wake of the crisis. These increases are likely due to an increase in "necessity" entrepreneurship rather than in "opportunity" entrepreneurship. Entrepreneurial efforts based on opportunity are much more prevalent in strong economies, while necessity entrepreneurs become self-employed because they have relatively few other options available. Figueroa-Armijos, Dabson, & Johnson (2012) found that in both rural and non-rural counties in America, necessity entrepreneurship increased during the Great Recession.

Further, Fairlie (2013) found that higher local unemployment rates during the Great Recession were found to increase the probability that individuals started businesses. His findings suggest that the positive influences associated with the strong motivation to pursue entrepreneurial efforts outweighed the negative factors associated with the weak economy. These findings would suggest that entrepreneurial endeavors are slated to increase (perhaps substantially) in the wake of COVID-19.

Reduced Demand AND Necessity Entrepreneurs

The review of literature on entrepreneurial efforts in the wake of the high unemployment rates associated with the Great Recession appears to be contradictory. However, further analysis suggests that both theories are likely correct. The two competing theories simply approach the data from different perspectives.

There appears to be no doubt that there were fewer self-employed individuals after the Great Recession than before the crisis. The negative economic conditions triggered many self-employed individuals to fail, and many entrepreneurs were forced to look for other work in the heart of the crisis. Perhaps they found it.

A factor that may have influenced this result is the speed at which America recovered from the Great Recession. The bounce off of the bottom was both swift and strong. The return to quality can be partially seen in equity market indices from 2008 to 2010. For instance, the Russell 2000 (an index consisting of approximately 2000 of the smallest companies in America) suffered a negative 33% return in 2008, but enjoyed a 27% gain in 2009, followed by another 27% positive return in 2010. It is possible that the entrepreneurs who were struggling to keep their businesses afloat were able to simply find another job quickly and easily within a short time frame. With growth fueling the economy shortly after the heart of the crisis, the availability of new jobs could have served to decrease the entrepreneurial endeavors associated with the Great Recession.

However, for those individuals who lost their jobs during the heart of the crisis, there also appears to be little doubt that a larger-than-average number of these individuals chose to pursue self-employment, most likely out of a perceived necessity. While the recession would be extraordinarily brief, no one was able to predict this fact at the time. Starting a business likely seemed like the only option for many out-of-work Americans.

Therefore, the large number of new entrepreneurs and the large number of failed entrepreneurs simply served to increase the variance of entrepreneurship during the crisis. An abnormally high number of entrepreneurs failed, while at the same time, an abnormal number of new entrepreneurs were created. Therefore, considering this perspective, both theories are correct.

Government Response to COVID-19

In response to the COVID-19 pandemic in 2020, Congress passed the American Relief Package with three provisions geared directly to aid businesses struggling amidst unforeseen shutdowns, including small business tax credits, the Emergency Capital Investment Program and most notably, the Payroll Protection Program. Like previous programs initiated during the Great Depression and the Great Recession, these plans were aimed directly at stabilizing and providing relief to businesses. In that regard, a portion of the American Relief Package should provide more opportunities for an economic bounce-back, just as in the Great Depression and Great Recession.

If history follows course, we should see an increase in entrepreneurial ventures, perhaps borne of opportunity, or perhaps necessity. However, this would prove true if the relief package was limited to aiding businesses in the form of stimulus and loans, and if the relief was viewed in that silo. However, none of the measures taken to rejuvenate the nation’s economy in the previous two historical periods included the artificial stimulus provided in the American Relief Package, in particular the additional federal unemployment benefits supplementing the various state unemployment benefits already in place. This additional stimulus was a new initiative meant to give needed temporary aid to individuals who lost their jobs due to the COVID-19 pandemic. It paid additional direct supplemental unemployment cash benefits. What was unusual is that these payments were on top of the unemployment benefits already received at the state level.

Could the Governmental Response Reduce Entrepreneurial Activity?

The American Relief Package also broadened direct financial subsidies for child care, especially those in single family homes. The rationale for these increased subsidies was that many people were either mandated, or chose, to work from home. For many working families, the choice to work from home was a necessity because they could not afford childcare and virtually all children were required to learn at-home during the pandemic.

For many of these families, the total amount of subsidies was more than they were making or could make in their current or previous jobs, therefore decreasing incentive to return to work. In fact, according to a study by the Foundation for Government Accountability (Dublois & Ingram, 2021), a person would earn $3,700 per month, or more than $44,000 in cash or cash-equivalent benefits by staying at home. In some states, such as Hawaii, this could even be as much as $4,300 per month or $52,000 per year. These findings were based on the estimated wage replacement rates for earnings at the 25th income percentile, the $300 weekly unemployment bonus, food stamp allotments for a family with those income and household characteristics, the child tax credit for two children under the age of six, and earned income tax credit values for an individual earning wages at the 25th income percentile in the prior tax year.

Could this provide a disincentive to return to work, thus hampering the bounce-back in our economy needed to provide new jobs? Could that delay reopening the economy and give potential “opportunity” entrepreneurs cause to delay their plans until the economy shows more stability? Are these additional payments making some potential “necessity” entrepreneurs reconsider whether taking the risk of starting their own new businesses outweigh the benefits earned by staying at home and getting paid?

Governmental Efforts During the Great Recession and Great Depression

Many states are now divided on whether this additional aid is hindering the effort to get people back into the workforce under the thought that many people are making more from their combined unemployment checks than they could make returning to their jobs. Policies enacted by Roosevelt's Great New Deal were enacted to stimulate a suffering economy by substituting a depressed free market with jobs offered through the government, thus injecting money into the economy through the hands of a previously unemployed workforce. Major actions were taken at that time, including establishing the Securities and Exchange Commission, the Federal Deposit Insurance Corporation, the Social Security Administration, and unemployment insurance funded by employers. All of those policies were enacted to save future generations however; even the unemployment benefits were not meant to provide direct payments to those who lost their jobs during the Depression.

While the economy was ultimately saved, and many people were back on the path of prosperity, it did so through encouraging work, not paying people more to remain unemployed. The most widely held view by economists (and the general public) is that the war effort ended the Great Depression. In addition, other economists hold the view that monetary expansion was the main factor (Steidel, 2007). Either way, most economists agree that it was not "New Deal" social policies that put the economy back on track. One thing that is not in dispute, however, is the fact that many of those policies enacted by the New Deal are still in effect today.

It could be argued that jobs created with the establishment of the Civilian Conservation Corps gave the unemployed the comfort of a wage without the risk of starting their own business, thus negating the "necessity" of people starting new businesses. Of course, on the other hand the rising tide of the economy overall provided inducement for entrepreneurial minded individuals to get a piece of the action. So, perhaps entrepreneurial ventures boomed, just not for the same reason.

In order to promote economic recovery during the Great Recession, two specific government programs were enacted, the Troubled Asset Relief Program in 2008, and the American Recovery and Reinvestment Act of 2009, with the emphasis on saving, or even "bailing-out", businesses to save the economy as a whole. The programs were intended to help businesses struggling from the recession by infusing money into the banking system to allow additional lending to help these targeted businesses. It should be noted however that not all government relief packages meant to stimulate small growth are created equally. One study by Jacques, Baldwin, Moylan, & Nigro (2016) found that while TARP infused $200 billion into 800 commercial lending institutions, it failed to increase small business lending at participating banks beyond what was observed at nonparticipating banks. In contrast, a second program introduced in 2010, the Small Business Lending Fund (SBLF) program, appears to have been a success as both large and small banks participating in the loan fund significantly increased their lending to small firms. It invested over $4.0 billion in 332 institutions.

While this paper attempts to prognosticate the future of entrepreneurial ventures in the wake of COVID-19 based on historical perspectives, the impact of governmental easing of lending to small businesses, vital to entrepreneurial growth, should not be overlooked. Again, much like the laws enacted during the New Deal, none of the programs instituted during and after the Great Recession were specifically geared toward direct payments from the government to those who lost their jobs during the recession. Jobs were created, businesses were helped, lending was opened up, but payments to remain unemployed were not part of the aid package. If anything, without additional unemployment benefits, most people would have taken the newly available jobs or would have been encouraged to become “necessity” entrepreneurs.

Comparing New Business Applications (The Great Recession and COVID-19)

Since 2004, the U.S. Census Bureau has provided data on new business formations called the Business Formation Series (BFS). This data is provided in various subsets, but all within four general categories.

1. Business Applications (BA) represent all applications for an Employee Identification Number (EIN).
2. High-Propensity Business Applications (HBA) are those applications with a high propensity of turning into businesses with a payroll.
3. Business Applications with Planned Wages (WBA) are those within the HBA category that indicate a first wages-paid date as shown on IRS form SS-4. This indicates a high likelihood of transitioning into a business with payroll.
4. Business Applications from Corporations (CBA) are HBA from a corporation or personal service corporation as shown on the IRS form SS-4, which like the WBA, indicate a high rate of transitioning into businesses with a payroll.

Using this BFS data, authors of a working paper commissioned by the Center for Economic Studies posited that there were great differences in the paths and composition of new business formations during the Great Recession and COVID-19. Whereas the fall in new business applications was slow and persistent during the Great Recession, there was a sharp V-shaped recovery during the early stages of COVID-19. However, the makeup of those applications was starkly different.

The data showed a larger portion of the new business applications during COVID-19 tended to be categorized as those with a lower propensity of transitioning to employer-based businesses (Dinlersoz, Dunne, Haltiwanger, & Penciakova, 2021). The study also found that business applications fell and remained low during the Great Recession, but after an initial decline, transition rates recovered. In contrast, while business applications fell sharply during the heart of the coronavirus pandemic, they rebounded several weeks later. The transition rates (those leading to wage-based applications or “WBA”) also fell, but remained depressed through the thirty weeks they studied. The difference in applications from the Great Recession was in the composition of the applications, with more of the applications during COVID-19 leading to non-wage-based applications (non-WBA). (Dinlersoz, et al. 2021).

It is too early to tell whether these business applications will turn into wage-paying jobs, but it is an indication that more individuals may be acting on their dreams of opening their own small business after the pandemic allows a return to normal.

CONCLUSION & AREAS FOR FUTURE RESEARCH

The COVID-19 pandemic did not fully impact the economy of the United States until March 2020, and its affects continue through the writing of this paper. The resurgence of cases due to the latest Delta variant has further complicated any restart of the economy and concordantly any research on economic impacts. The introduction of the Delta variant came at a time when the country was beginning to return to "normal" again, however the uptick in new cases has deepened the divide between people and continues to fuel questions on the best ways to jumpstart the economy while keeping the virus in check.

As discussed, many states have opted to withdraw from the additional unemployment stimulus offered by the federal government, thereby removing disincentives to returning to work in hopes of reviving their own state economies. These states began pronouncing their intentions in May, 2021, but most did not take effect until June, July and August of 2021. The impacts of these decisions on new business formations will lag to some degree, so the resultant correlation of dropping additional federal unemployment payments to the rise in new business formations from "necessity" entrepreneurs will not be available for some time; however, it is a topic worthy of future research.

Concurrently, there needs to be consideration given to new innovations that have arisen during this crisis and the resultant new business opportunities associated with them. In attempting to draw correlations among states that have dropped unemployment benefits and their impact on new business applications (perhaps indicating new "necessity" entrepreneurs), we must also draw a correlation to industries supported in these states. For example, while California and the western states may continue to offer supplemental federal unemployment benefits, which in theory would limit new "necessity" entrepreneurship, these states are also homes to many high-tech companies which have prospered during COVID-19 due to the increased work-at-home business model employed during the pandemic. Some potential entrepreneurs may see the opportunity to start their own business in response to the demands of the new economy. The increase in business applications of these "opportunity" business applications may negate the possible decrease of new "necessity" business applications in these same states, thereby making it a challenge to draw direct inferences from the data.

Further research may provide answers as to whether people start new businesses out of necessity, or it may suggest entrepreneurs read the tea leaves and take the risk of starting a new business after perceiving new opportunities in a returning, restructured economy. Or research may find it to be a combination of both. In an effort to predict the impact of governmental policies on new business applications during times of economic distress, it is essential to continue research in this area.

Governmental policy aside, it is a fact that many Americans still remain unemployed after businesses were forced to cut jobs in the heart of the crisis. Is it possible that a significant number of these workers will pursue self-employment? Even though many companies are currently attempted to hire back much of their workforce, the findings seem to suggest that they will. Much literature suggests that "necessity" entrepreneurship will take place. When faced with no other viable options, those individuals with the motivation, skill, and ability will pursue entrepreneurial activity. The hitch in the findings comes from the fact that many entrepreneurial efforts (both new and existing) will fail. Small entrepreneurs who were scraping by before the coronavirus will likely not be able to survive, and many new self-employed individuals will find their entrepreneurial efforts to be unsuccessful. But isn't this the heart of capitalism? Failed business strategies will produce failed results, but entrepreneurs who are able to discover ways to add value, will succeed. Therefore, the key for entrepreneurs becomes the ability to create something valuable and market it successfully. New entrepreneurs must be mindfully strategic if they hope to succeed. Fortunately, help is available.

Another factor associated with the Great Recession was a sizable increase in the level of educational initiatives made available to up-and-coming entrepreneurs. Colleges and universities, in particular, exhibited a renewed focus on providing their students with a return on their investment (Ellis, 2018). Much of these educational initiatives included classes and training in business and entrepreneurship, and fortunately, many of these initiatives have remained in place for this latest economic crisis. In some cases, these resources have even been improved since the Great Recession. Whether you can teach someone to be a successful entrepreneur remains a debatable topic, but if education can increase the odds of entrepreneurial success, then isn't it worth a rededicated effort (McMurtrie, 2015)?

Education may be the key for many of these laid-off workers to discover and enjoy entrepreneurial success. Hopefully, these new "necessity" entrepreneurs will find the opportunity to obtain low-cost assistance (both educational and otherwise) that will serve to increase their chances of success. The nation needs these new entrepreneurs to find ways to compete and succeed in the "new" post-coronavirus economy.

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U.S. SMALL BUSINESSES: A QUANTITATIVE ANALYSIS OF WORKING CAPITAL MANAGEMENT AND PROFITABILITY WITHIN THE MANUFACTURING SECTOR

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Abstract

Working capital is a key consideration for firms of all sizes because it is often the basis for operational options. In the case of small manufacturing businesses, leaders must pay close attention to the active and successful working capital policies because they may be the difference between success and failure. Hence, prudent leaders in these businesses seek practices and principles that enhance the potential for achieving organizational growth and optimal profitability. While there is a substantial study connecting working capital to profitability in small and larger firms around the world, there is limited research on the small manufacturing firms in the United States. Thus, this study was designed to answer the research question, To what extent does the working capital management (average collection period, inventory conversion period, average payment period, and cash conversion cycle) explain profitability of small manufacturing businesses? This study was conducted using a nonexperimental, quantitative research method. The population for the research was comprised of publicly held small manufacturing companies listed on the U.S. Security and Exchange Commission (SEC) for the period from 2011 to 2015. The study was completed using archival secondary data from publicly traded small manufacturing firms' financial reports. The financial statements were balance sheets, income statements, and statements of retained earnings. The findings of the study showed there was a significant relationship between working capital and profitability. The results also showed there was a significant relationship between average collection period and profitability, while it also established there was no relationship between cash conversion cycle and profitability of small manufacturing businesses.

INTRODUCTION

Finance is the backbone of every business and serves as the central factor in the operation and success of business, particularly the small businesses (Attom, 2016; Karadag, 2015). Every business requires capital for the start-up and the day to day operations of the firm (Attom, 2016). However, the recent financial crisis of 2008 and the subsequent collapse of some companies illustrates that businesses fail when they do not efficiently manage their working capital (Haron, & Nomran, 2016). Empirical research also indicates that working capital practices directly impact the profitability of small manufacturing firms (Afrifa, 2015; Haron, & Nomran, 2016).

The dynamic, unpredictable, and stormy business environment shows that businesses must adjust to the paradigm shift and continue to develop smart management practices to stay competitive. One of the effective management practices is the use of efficient and resourceful working capital management to ensure small businesses survive in this unpredictable business environment (Anarfi & Boateng, 2016; Karadag, 2015). The efficient and effective working capital strategies have become critical and crucial for small businesses; hence, the need to identify practices and fundamentals that seek to increase the potential for achieving an organizations' growth and optimal profitability. The efficient management of working capital is imperative, particularly for manufacturing companies where most of its operations involve the use of current assets (Bagh, Nazir, Khan, Khan, & Razzaq, 2016).

Anarfi and Boateng (2016) noted that a firm could derive its working capital from the differences between its current liabilities and current assets. Working capital is current assets less current liabilities (Knauer & Wohrmann, 2013; Singh & Kumar, 2017). Current assets create a dominant part of money inflows for organizations whereas current liabilities constitute the biggest wellspring of short-term money surges for companies (Knauer & Wohrmann, 2013; Singh & Kumar, 2017). As working capital elements (accounts receivable, cash conversion cycle, inventory, and accounts payable) have a unique impact on company's profitability, firms' managers must be assiduous in dealing with running capital (Banos-Caballero, Garcia-Teruel, & Martinez-Solano, 2013; Panda & Nanda, 2018).

Working capital management and profitability, previously overlooked by researchers, are now gaining attention as a result of the importance of short-term capital and current liabilities of firms (Afrifa, 2015; Napompech, 2012). This study was designed to explain the relationship between working capital management and profitability of manufacturing small businesses across the United States. This chapter includes the background of the study, the statement of the problem, the purpose, significance of the study, the research question, and the research design. The remaining sections in the chapter detail the assumptions and limitations of the study and the definition of terms used in the study.

Background of the Problem

Small businesses play significant roles in the development of every economy and are recognized as engines of economic growth (Karadag, 2015). Successful small businesses are the pillars of the U.S. economy and contribute 65% of private sector employment (Gill & Biger, 2013; Warren & Szostek, 2017). As indicated by the U.S. Small Business Administration (2019), small businesses provide 99.7 percent of all employable businesses and fuel economic growth through the provisions of employment opportunities to people who may not be absorbed by larger corporations. Hayes, Chawla, and Kathawala (2015) also maintained that the U.S economy depends on the growth of small businesses, which draw talents who create new products or execute new solutions for existing thoughts.

However, many small manufacturing firms are unsuccessful in their first five years of startup (Decker, Haltiwanger, Jarmin, & Miranda, 2014) due to reduced working capital practices (Karadag, 2015). Cheatham, Dunn and Cheatham (1989) argued that despite the importance of working capital management, it is one of the areas frequently ignored by small business. Insufficient control of account receivables, account payables, inventories, and cash conversion cycle accounts for the first five years often results in failures (Jamil, Al Ani, & Al Shubiri, 2015). Practical and resourceful working capital practices play an important role for small businesses to attain higher profitability and growth (Jamil et al., 2015). A weak and unproductive working capital management plan can foster additional accumulation of inventories and reduced the liquidity and profitability of firms (Jamil et al., 2015). Furthermore, efficient working capital management helps in creating business value (Bagchi, Chakrabarti, & Roy, 2012; Jamil et al., 2015). Enthusiasm for working capital management may originate from its impact on a firm's risk and returns (Konak & Guner, 2016) because working capital choices include a trade-off between profitability and risk (Afrifa, 2015).

Moreover, working capital management is important due to its effect on a firm's risk and return (Karadag, 2015.). The central objective of working capital is to guarantee that businesses have satisfactory income to continue daily operations in a manner that reduces the danger of an inability to pay transient commitments. Furthermore, Samiloglu and Akgun (2016) explained that firms should avoid additional interest on working capital. Whereas additional investment in working capital can decrease the risk of lack of liquidity, small levels of working capital may bring about shortages and difficulties in addressing daily operations (Mansoori & Muhammad, 2012; Samiloglu & Akgun, 2016). Samiloglu and Akgun (2016) highlighted that decisions about working capital may be used to illustrate the financial-risk return decisions of management. Expanding a company's net working capital, increasing current assets, and decreasing current liabilities can minimize the danger of a company not having the capacity to meet its commitments (Barine, 2012; Jamil et al., 2015).

According to Gill and Biger (2013), a firm should have sufficient cash accessible to meet its immediate and daily obligations. Again, to motivate and persuade customers to increase sales, an organization should be able to offer some of its goods on credit to customers. Further, the accessibility of inventory will indicate that a firm can meet urgent customer requirements, preventing a break in production and upholding customer trustworthiness (Zhang et al., 2019). However, there should be a balance between the amount of money a company's debtors have in inventory and the price the firm can get from its creditors (Zhang et al., 2019). The difference between the amount owed to creditors and the amount borrowers owe in goods will show the working capital accessible to a company to meet its short-term requirements (Karadag, 2015). Therefore, because inefficient working capital has a negative effect on profits and growth of a firm, efficient working capital practices are crucial to survival, success, and growth of small businesses (Gill & Biger, 2013; Karadag, 2015). Considering the importance of working capital management and the difficulties the small manufacturing businesses may face in accessing capital, the study of the relationship between working capital management and profitability of manufacturing small businesses may prove useful to practitioners.

The theory that supported this research was the working capital management theory. The structure that supports the theory of research is the theoretical framework, with the theory and the theoretical framework forming the foundation for conducting this research (Eisenhardt, 1989). Fox, Gardner, and Osborne (2015) maintained that theories are essential to research and direct study questions, application strategies, and analysis of the process of any investigation. The extant literature showed that the working capital theory, cash conversion cycle theory, and profitability theory are the underpinnings that may connect a firm's performance to profitability (Aminu & Zainudin, 2015; Gill, Biger, & Obradovich, 2015).

Statement of the Problem

This research was designed to understand the relationship between working capital management and profitability of small manufacturing businesses across the United States. The study provides new knowledge to researchers on working capital management, particularly that of small manufacturing businesses. According to Afrifa (2015), efficient working capital practices are important for small businesses because of a firms' inability to access financial credit from banks. Many research studies showed that small businesses often encounter challenges in accessing capital for the operation of the businesses. Sunday, Norfaiezah, and Mohamad (2017) argued that small businesses underperform due to the lack of access to credit from financial institutions. Jingmeng (2013) also noted that small businesses fail to achieve their targeted profitability due to challenges in obtaining adequate financing from banks. Due to the inability to get funds from the financial markets, small businesses rely on suppliers' credit as their primary sources of funding for daily operation. The small business dependence on short-term capital makes the application of efficient working capital management critical for their survival and growth (Gill & Biger, 2013; Karadag, 2015).

Moreover, small manufacturing firms keep greater liquidity which makes working capital practices very significant regarding profitability. This is because working capital management is concerned with the current assets and current liabilities of business (Gill & Biger, 2013; Karadag, 2015). Considering the significance of working capital management, several studies have focused on examining the relationship between working capital management and profitability of larger corporations across the world, but less research has been conducted on small businesses across the United State especially in the manufacturing industry (Jamil et al., 2015; Makori & Jagongo, 2013). Additionally, while some studies have been conducted on the relationship between working capital management and profitability of small firms in retail, banking, and agricultural industries, not much research has been conducted on manufacturing industries (Attom, 2016; Bhatia & Gupta, 2018). Thus, further research on the relationship between working capital management and profitability of United States publicly held small manufacturing firms is needed to fill this gap.

Purpose of the Study

The purpose of this quantitative nonexperimental research was to examine the relationship between working capital management and small business profitability in manufacturing firms across the United States. In this study, the independent variables (IVs) were average collection period, inventory conversion period, average payment period, and cash conversion. These variables can be used to predict the performance of current assets and current liabilities (Attom, 2016; Bhatia & Gupta, 2018). The study variables served as the proxy of working capital management.

The dependent variable (DV), profitability, is described as the performance indicator of business success (Karadag, 2015). Profitability ratios are mostly measured by the net operating profit (NOP), return on assets (ROA), return on equity (ROE), and gross operating profit (Karadag, 2015; Singhania, Sharma, & Yagnesh Rohit, 2014). However, for this study, gross operating profit (GOP) was used as the measure of profitability. GOP is viewed to be an appropriate measure of the suitability with which a firm uses its assets to generate income (Karadag, 2015; Singhania et al., 2014). The more the estimation of the ratio, the more effective is the firm in utilizing its assets.

The study population comprised small manufacturing publicly traded companies listed on S & P Capital IQ NetAdvantage database. The study also aimed to provide managers of the small businesses the importance of the efficient working capital management plan to increase profitability. The study may contribute to reducing such a gap and add to the existing literature on small business performance.

Significance of the Study

The importance of this study is its value for scholars and practitioners. The scholars may use the findings to better understand the relationship between working capital management and profitability of small businesses as well as have this gap addressed in the existing literature on working capital management. For practitioners, the findings may heighten the understanding of the association between working capital management and profitability of small businesses and may be used at the small business management level to sufficiently promote satisfactory liquidity, profitability, and value for the shareholders (Madugba & Ogbonnaya, 2016). As such, small business leaders may have more reasons to develop strong knowledge of current assets and liabilities utilization. The association between working capital management and profitability is critical to small businesses in understanding the financial credit process applied to daily operations of the business (Haron, & Nomran, 2016). The study may also be of value to other companies aiming to enhance profitability through the improved working capital practices (El-Maude & Shuaib, 2016). Additionally, the findings of the study may help the leaders of the small businesses to recognize the problems in their current working capital management and develop strategies and training to address the issues (El-Maude & Shuaib, 2016). For example, small business leaders could use the study to develop the relationship between debtors and credits to obtain appropriate funding (Ayub, 2015).

In addition to the leaders, the findings of the study may be of value to creditors, employees, customers, and investors in different ways. The study might enlighten shareholders, financial analysts, administrators, and stakeholders in manufacturing industries on the importance of operating capital (Dermawan & Indrajati, 2017; Kroes & Manikas, 2014). Furthermore, employees of the firm may benefit if effective working capital management is put in place to optimize the profit of the business. With higher profitability, managers can pay bonuses, offer higher compensations, improve working conditions, and provide adequate training to employees.

Additionally, the findings may be used to develop efficient working capital practices, and with improved practices, small businesses may be better positioned to address social responsibilities in the communities in which they operate. Small businesses with optimal profitability may invest in infrastructure, health and education programs to benefit the communities (Ayub, 2015; Madhou, Moosa, & Ramiah, 2015). As discussed by Porter and Kramer (2011), business leaders could make a great impact in the society by unleashing the force of their organizations to take care of vital social issues.

Finally, researchers may utilize the study to identify further research gaps, add other methods, extend the theory, and further operationalize the constructs of working capital management and profitability.

Research Questions

Research questions assist academics to choose suitable research methodology, research design, sample, data collection, and data analysis. According to Allwood (2012), every scientific study has questions that help to address the gap in the literature. As stated earlier, the purpose of this quantitative nonexperimental study is to examine the relationship between working capital management and small business profitability in manufacturing firms across the United States.

Research Questions and Hypotheses

This study was led by one main research question and four subquestions: To what extent does the working capital management (average collection period, inventory conversion period, average payment period, and cash conversion cycle) explain profitability of small manufacturing businesses?

H_{01}. The working capital management does not statistically significantly explain the profitability of small manufacturing businesses.

H_{a1}. Working capital management does statistically significantly explain the profitability of small manufacturing businesses.

Subquestion 1. To what extent does the average collection period explain the profitability of small manufacturing businesses?

SubH_{01}. The average collection period does not statistically significantly explain the profitability of small manufacturing businesses.

SubH_{a1}. The average collection period does statistically significantly explain the profitability of small manufacturing businesses.

Subquestion 2. To what extent does the average payment period explain profitability of small manufacturing businesses?

SubH_{02}. The average payment period does not statistically significantly explain the profitability of small manufacturing businesses.

LITERATURE REVIEW

Regarding the topic of the relationship between working capital management and profitability of manufacturing small businesses within the United States, a review of the literature on this topic indicated that less than 50 studies had been completed in the last five years on the relationship between working capital management and the small manufacturing firm's profits around the world (El-Maude & Shuaib, 2016). The importance of working capital management for practitioners and the limited research on the topic, highlight a gap of significance, particularly, for manufacturing small businesses. The study of working capital began in 1918 when Olaf Mann first introduced the concept (Mann, 1918).

Numerous researchers have recognized the importance of working capital management to firms (Adam & Quansah, 2019; Sisay & Nongmaithem, 2019). Extant literature also affirmed that working capital management influences profitability (Kieschnick, Laplante, & Moussawi, 2013; Sisay & Nongmaithem, 2019). Nortey et al. (2016) declared that working capital management allows a firm to have adequate cash flow available to pay its operational expenses and short-term liabilities. The procedure implies the well-organized working capital guarantees sufficient funds existing for the daily operations of businesses. The manner working capital is overseen, significantly influences the total financial performance of any company and its essential existence (Bhatia & Srivastava, 2016). Indeed, the working capital management is exceptionally multifaceted, moreover because of the presence of a converse association with liquidity and profitability (Sisay & Nongmaithem, 2019). Bhatia and Srivastava (2016) noted that the competitive business environment encourages businesses to concentrate more on maximizing profitability that cannot be realized unless the management of firms advances strategies that will increase efficiency. The working capital management, therefore, becomes the right tool to improve efficiency ((Kasozi, 2017; Knauer & Wohrmann, 2013). However, Bhatia and Srivastava (2016) argued that a rigorous working capital management may result from a liquidity problem, while a slack working capital management may lead to decrease in profitability. Consequently, working capital management strategy includes efficient management of cash, account receivables, account payables, and inventory (Bhatia & Srivastava, 2016).

Kasozi (2017) affirmed that working capital administration is one of the most significant and vital parts of short-term financing of a firm. Kasozi further noted that companies of all sizes use profitability as a measure of performance, often based on the effective and efficient management of working capital. Vijayakumaran and Vijayakumaran (2018) affirmed that well-organized working capital administration may be used to maintain equilibrium between liquidity and profitability across the firms' processes, and the impact of effective working capital management on profitability has gotten the attention of researchers. Ahmed, Awan, Safdar, Hasnain, and Kamran (2016) opined that liquidity is the firm's ability to ensure timely payment of its present commitments; whereas profitability is the firm's capacity to earn. Ahmed et al. (2016) further noted that working capital encompasses all the short-term assets and are utilized in daily operations. Vijayakumaran and Vijayakumaran (2018) also maintained that a company's short-term debts could effortlessly be met through the evaluation of its liquidity. Nastiti et al. (2019) further averred that any business which has the appropriate structure of liquidity would likely have adequate cash for the timely payment of its short-term debts.

After Fess study in 1966, Kim, Rowland, and Kim (1992) investigated the working capital practices of Japanese manufacturing companies in the United States. Their study focused on the objectives of working capital management by Japanese manufacturing companies in the United States and the relationship to profitability. They gathered data from 94 manufacturing companies. The Kim et al. (1992) study showed that Japanese manufacturing companies in the United States viewed working capital management as the most critical management tool to provide current assets and credits to fund the daily operations of the business, resulting in increasing profitability.

Hyun-Han and Soenen (1998) also explored the efficiency of management of working capital and corporate profitability utilizing a panel data regression analysis of a sample firm gathered from Compustat's annual archival data from 1975-1994. They utilized operating income and depreciation as a measure of profitability, while the net trade cycle was used as a proxy for the working capital management component. Hyun-Han and Soenen established that efficient working capital management is essential to the complete corporate approach to create shareholder worth. They, therefore, opined that the way working capital is applied in a firm could significantly influence the liquidity and profitability of the company. They found a strong negative relationship between the net trade cycle and corporate profitability. They interpreted the negative regression coefficient to mean that a business with a reasonably short net trade cycle could maximize profitability.

In 2007, Martinez-Sola, Garcia-Teruel, and Martinez-Solano (2014) delivered experiential evidence about the impact of working capital management on profitability for a panel data of 8,872 small to medium businesses for the period from 1996 to 2002. They used return on assets (ROA) as a measure of profitability, while the number of days of accounts receivable the number of days accounts payable, and the number of days of inventory were utilized as a measure of working capital management. According to Martinez-Sola et al. (2014), the efficient working capital policy positively impacted the profitability of small businesses. Their study suggested that firms can generate worth by decreasing inventories and the number of days of accounts receivable. The results of their research showed that there is a significant negative relationship between small business profitability and the number of days accounts receivable and inventories. The outcome indicated that efficient utilization of working capital management could improve the profitability of small firms. Singh and Pandey (2008) also conducted a study on the impact of working capital management and profitability of Hindalco Industries Limited, using secondary data from 1989 to 2007. The study objectives were to better understand working capital analysis, the component of working capital, trends of working capital, and the effect of working capital management on profitability. Singh and Pandey revealed that for businesses to maximize profitability, they must relinquish solvency and sustain a minimum level of current assets. According to these researchers, if firms maintain a low level of current assets, profitability will increase as less money is held in the unused current assets. Singh and Pandey concluded that efficient application of working capital management has a significant impact on profitability. Furthermore, the Singh and Pandey study showed the importance of stringent working capital policy, mainly, for the manufacturing businesses where inventory is critical for the daily operations.

In 2010, Zainudin and Regupathi explored the effect of working capital management on the profitability of small to medium manufacturing enterprises in Malaysia, utilizing accounts receivable as a proxy for working capital management. The study was based on secondary data obtained from archival financial statements of manufacturing small businesses for the period 2001 to 2004. According to Zainudin and Regupathi (2010), accounts receivable plays an essential role in a firm's success and that late receipt of funds from creditors provides a negative impact to the business. Furthermore, Zainudin and Regupathi (2010) noted that 29 percent of a firm's current assets are made up of accounts receivable; hence the late collection of receivables can result in increased collection costs and bad debt expenses. The results of their study showed companies that collect their accounts receivable on time increase profit.

Since 2012, practical support exists for working capital management and profitability. The studies contain findings that working capital is more significant to small businesses than larger companies because small businesses have less or no access to outside financing (Afrifa, 2016; Kieschnick et al., 2013; Vijayakumaran & Vijayakumaran, 2018). Firms depend extensively on working capital as a source of financing (Afrifa & Tingbani, 2017). Afrifa (2016) added that small businesses, relatively, hold more current assets and liabilities as a percentage of total assets and liabilities compared to larger companies; hence the need for small companies to provide efficient and effective working capital management. Singh and Kaur (2017) confirmed that for a small manufacturing business, current assets represent more than half of the overall assets.

Working capital management was shown to improve the financial position of companies regarding liquidity (Hoang, 2015) as well as productivity and value (Singh & Kumar, 2017; Vijayakumaran & Vijayakumaran, 2018). Consequently, lessening liquidity can escalate the cost-efficiency of the firm, or the increase of liquidity may decrease the profitability of the firm (Hoang, 2015. Robust, efficient management of working capital may create a strong cash position, with a positive impact on profitability (Hoang, 2015).

Existing studies also presented the association between working capital administration and profits. Afrifa, Tauringana, and Tingbani (2015) connected management of working capital to profitability and established the favorable relationship between operating working capital and companies' profits. Furthermore, in another study by Aminu and Zainudin (2015), the association between working capital practices and companies' profitability was examined. The results showed a positive association between operational capital and profitability. Additionally, Nastiti et al. (2019) noted that some studies investigated the correlation between functioning capital practices and business' profitability, with concentration on the relationship between the cash conversion cycle and the profits of firms. Consequently, firms were found to increase their productivity, when the firm had working capital in place and acceptable oversight by management. These findings were consistent with the position on working capital management held by Tran el al. (2017) that if businesses efficiently control accounts payable, inventories, accounts receivable, cash management, and cash conversion cycle, they will ultimately improve profitability.

Studies in the United States on working capital management and profitability of corporate manufacturing firms supported the linkage between working capital management and profitability. Gill and Biger (2013) examined the impact of corporate governance on working capital management efficiency of American manufacturing firms using correlational and nonexperimental research design. The researchers selected 500 financial statements from publicly traded companies from 2009 to 2011. Gill and Biger noted that by administrating working capital efficiently, owners of businesses could get optimal returns on investment. Gill and Biger found a significant positive relationship between working capital management and profitability. Kroes and Manikas (2014) explored the importance of working capital management and profitability on manufacturing companies in the United States and shared findings, which indicated that there is a relationship between working capital management and profitability. Literature outside of the United States also includes empirical support for the association between working capital management and profitability of firms.

In examining the relationship of working capital management and profitability of Turkey manufacturing companies, Samiloglu and Akgun (2016) posited that appropriate working capital administration remains essential to a company's viability and profitability. Moreover, the researchers argued that active management of working capital rests on a successful firm playing a vital part in the upsurge of shareholder value. Similarly, active running of working capital contributes to business success. Samiloglu and Akgun explained that the central goal of working capital is to guarantee adequate cash flow for daily operations to reduce the risk of the company's inability to pay the short-term obligation. Furthermore, Samiloglu and Akgun established that financial managers of businesses should maintain adequate investment in working capital. They argued that additional financing in working capital can decrease the threat of scarcities and problems in day to day operations. They shared in their findings the substantial and negative relationships between accounts receivable periods and return on equity, return on asset, net profit margin, and operating profit margin in the manufacturing industry in Turkey. Additionally, they noted the significant and positive relationships between cash conversion cycle, accounts receivable, and return on assets.

Adam and Quansah (2019) investigated the linkage between working capital management and owners' value creation for six manufacturing firms listed on the Ghana Stock Exchange from 2000 to 2013, with a consolidated financial statement as their source of data. They employed a longitudinal explanatory nonexperimental research design. The researchers found that the conservative current assets policies of a firm boost profitability. However, they contended, at the same time, that aggressive current assets policies improve the market value of the firm. Furthermore, Adam and Quansah noted that a negative working capital suggested current liabilities exceeded current resources due to the investment in fixed assets and plants. Negative working capital established the weakness of the firm to meet its obligations (Adam & Quansah, 2019). Adam and Quansah further argued that long-term liabilities are most expensive than current liabilities. Consequently, current liabilities are a more attractive source for financing a business.

Adam and Quansah's (2019) findings demonstrated that the profitability ratios have statistically significant values and are decidedly connected with each other. They also observed that a firm's aggressive current assets financing strategy should balance with a conservative current assets funding strategy to create value for investors. The results also showed that cash conversion cycle has a positive connection with the receivable collection period and inventory conversion period, and a negative relationship with payment deferral period. The payment deferral period was measurably significant, with net operating profit and gross operating profit. The analysis suggests that companies that have a more accurate estimation of the number of days payables are more lucrative. Adam and Quansah found that a decrease in the cash conversion cycle results in profitability growth. Additionally, the regression analysis performed demonstrates a growth in a firm's number of days of receivables leads to a reduction in its profitability.

Haron and Nomran (2016) conducted a study to investigate the determinants of working capital administration of Malaysian companies by considering the effect of 2008 financial crisis. The research was motivated by how firms can deal with their functioning capital productively, irrespective of the economic situations. The actions would apply not only during a financial crisis period, but also preceding and after a difficult financial period. From the panel regression analysis, the authors found that while profitability, sales growth, financial obligations, cash flow and firm size are fundamentally influencing working capital management, profitability and firm size are the two factors steadily impacting working capital management regardless of the three difficult periods.

Paul and Mitra (2018) analyzed the impact of working capital practices on the profitability of the firm. Utilizing a sample of Indian steel firms, they applied current ratio, quick ratio, debtors' turnover ratio, and finished goods turnover ratio to investigate the speed with which businesses adapt, when focused on working capital at a prerequisite level (Paul & Mitra, 2018). Their findings indicated that sampled firms of the steel industry have adequate opportunity to improve their profitability using working capital in a more competent way.

Soukhakian and Khodakarami (2019) examined the effect of working capital practices on the profit of Iranian manufacturing companies in 2010, utilizing least squares to analyze the panel data. Soukhakian and Khodakarami (2019) found that a firm's administration should strive to create value for the shareholders by strengthening the working capital management policy to optimize profitability. Aktas, Croci, and Petmezas (2015) designed a study to understand if working capital management improves business value. Utilizing polynomial regression, they found effective administration improves business value when coupled with an ideal level of working capital, and when this ideal level of working capital was applied, it enhanced the performance of the stock and operating performance from the previous year. Aktas et al. proposed that productive working capital management is essential, particularly when extending an investment opportunity. They also recommended that corporate venture is a conduit for underperforming working capital.

Kasozi (2017) studied change in working capital administration and its effect on the financial performance of 69 listed manufacturing firms on the Johannesburg Securities Exchange, using a panel data methodology of cross-sectional units of observations. In his study, Kasozi explained that a business fund includes capital planning, capital structure, and working capital administration. Nevertheless, Kasozi noted that working capital administration is a critical element of a corporate fund, due to the profound effect on the organization's profitability and liquidity. The financial hypothesis of the firm requires that assets ought to be used productively to accomplish monetary gains (Kasozi, 2017). Furthermore, the researcher maintained that the competitive current business condition requires financial managers regardless of the mission of their business to guarantee effective use of the assets. This is because according to Kasozi, an important part of a companies' capital structure is the short-term assets and other resources acquired within a year. The researcher added that the financial administration of a firm depends on the management of its short-term activities.

As a case in point, Singh and Kaur (2017) studied the relationship between working capital management and profitability of 40 steel manufacturing companies in India from 2004 to 2016 and employed a panel data regression. The objective of working capital administration was to advance sustaining profitability and increase shareholders wealth. Singh and Kaur found that working capital management is one of the crucial areas of a firm's administration, and significantly affects the productivity of the firm. From the results, the researcher gathered that working capital variables have a significant effect on both the net profit margin and return on assets (ROA).

Summary

The literature review included the evolution of research on the topic and the research methods used by seminal and contemporary researchers. This chapter contains the method used to search for sources, the theoretical orientation utilized for the study, the actual review of the literature, a synthesis of the findings identified in the review, and a critique of the research methodology and procedures utilized in the sources in the literature review. From the literature review, it was apparent that several research studies on management of working capital and profitability particularly in larger firms in the United States have been done. However, not much has been done on small businesses across the United States.

The review of the literature also indicated that the study on working capital management dates back to early 1918 (Mann, 1918). Many researchers in the studies that were viewed noted that the efficient and effective management of working capital enabled companies to have acceptable cash flow necessary to pay operating expenses and short-term liabilities. Due to the challenges of many small businesses to obtain external credits, they depend upon the internal generation of funds through traders' credit; hence, prudent management of working capital is important. One way of optimizing the suppliers' credit is through efficient and effective working capital practices.

Several researchers shared findings regarding a negative relationship between the cash conversion cycle and profitability, where the period between the expenses associated with the acquisitions of raw materials and the collections of sales credits was too long and, therefore, reducing this time would improve profitability. Researchers also found that there is a negative relationship between accounts payable and profitability. In reviewing the literature on working capital management practices and the productivity of firms, this researcher has concluded that more research is needed concerning small businesses, particularly research related to manufacturing companies.

METHODS

The researcher used a nonexperimental quantitative research design in this study. The study used the nonexperimental research design because the research questions were written to examine the relationship between working capital management and profitability. Venkatesh, Brown, and Bala (2013) noted that scholars utilize a nonexperimental design to study relationship. An experimental research design was not appropriate for this study because the use of experimental research design involves manipulating variables or applying treatments to the participants (Venkatesh et al., 2013). The study utilized an archival approach to collect the data.

The researcher obtained data from the financial statements of publicly traded small manufacturing companies. The financial reports included the balance sheets, income statements, and statement of retained earnings. The data points were working capital, average collection period, average payment period, inventories conversion period, and cash conversion cycle as (IVs), with (GOP) as the (DV) of profitability. A standard multiple regression was used to analyze the data. The multiple regression was suitable for the study and made correlation analysis possible between one DV and numerous IVs (Plewis, 2018). SPSS v.24 was used to conduct the statistical test.

The study included the connection between working capital management and profitability of publicly held small manufacturing businesses; hence, the findings can only be generalized to the manufacturing industry. The data covered the period from 2011 to 2015 and were for 108 publicly held small manufacturing firms registered on the U.S. Securities Exchange Commission (SEC) Edgar website. The research was designed using a quantitative nonexperimental method to examine the relationship between working capital management and small business profitability across the United States.

Target Population and Sample

The population for the research comprised publicly held small manufacturing companies listed on the SEC for the period from 2011 to 2015. The researcher retrieved the audited financial statements from the SEC website. The size range of the firms fell within companies with $10 million and $250 million in total revenue. According to the Small Business Administration (2019), small business is defined based on size standard guidelines for different categories of businesses, which include agricultural production, retail, services, and manufacturing (Small Business Administration, 2019, Table of size standards). The size can be determined by the average annual revenue or by the number of employees. The Small Business Administration (2019) used the number of employees to determine the size standard of small manufacturing firms, which are between 500 to 1500 (Table of Size Standards). These small manufacturing companies with the number of employees between 500 and 1500 have revenue between $10 million and $250 million (Small Business Administration, 2019, Table of size standards). The study was limited to manufacturing companies within the United States. The researcher chose manufacturing companies because they invest significantly in accounts payables, accounts receivables, and inventories. Another reason for selecting the population was because all the pertinent data required to test the hypotheses and answer the questions were openly available. The researcher identified 948 manufacturing companies within this range.

To determine the requisite sample size, the researcher needed to know the satisfactory level of significance, effect size, and power. Moreover, the suitable sample size was one that would be both statistically practicable and economically possible. The significance level of the sample showed how much protection researchers need against inadvertently rejecting a correct hypothesis. The statistical power makes it possible in the test to avert the renunciation of an incorrect hypothesis, while the effect size is used to calculate the sizes of relationships or the size of variances in an experiment. Therefore, for this research study, a simple random probability technique was applied. With the use of G*power analysis methods, a sample size of 108 companies was calculated. The researcher utilized 5 years of public financial data from 2011 to 2015, listed on the SEC website. The 5 years were averaged out. Therefore, the study consisted of financial data for 108 companies. The companies selected for the study were limited to manufacturing companies with total revenue between $10 million and $250 million.

The study used G*power v.3.1.9.2 for the power analysis, utilizing a priori type of power analysis to compute the sample size with the effect size of 0.10, a significance level of 0.05, a desired statistical power of 0.90, and tested predictors of 5. The researcher utilized the effect size of 0.10 to offer a study that a financial analyst could confirm if the application of the research recommendations is suitable. The results produced a sample of financial statements of 108 companies from the SEC Edgar database. The researcher also chose multiple linear regression as the statistical test. The financial data consist of working capital, inventory conversion period, average collection period, average payment period, cash conversion cycle, and operating profit.

The research was designed to study the relationship between working capital management (average collection period, average payment period, inventory conversion period, and cash conversion cycle) and profitability (operating profit) of U.S. small manufacturing companies. Therefore, after receiving approval from Capella University’s Institutional Review Board (IRB), the researcher secured the archived data through the electronic collection of financial statements of 108 companies from the SEC Edgar database. The data consisted of 5 years (2011-2015) of financial statements from 108 publicly held small manufacturing companies. The small manufacturing companies were identified from NASDAQ and S & P Capital IQ NetAdvantage databases. The S & P Capital IQ NetAdvantage database is a complete website dedicated to investment and business information purposes. The researcher extracted the variables from the financial statements to calculate the *z* scores consisted of total current assets, total current liabilities, account receivables, account payables, inventories, and sales. The researcher used averages of the 5 years of the *z* scores of the working capital, account receivables, account payables, and inventories of each company to conduct the analysis. The researcher then transferred the data from an excel spreadsheet into SPSS v.24 to determine which variables meaningfully influenced the relationship. Indeed, according to Tasic and Feruh (2012), the gathering of a panel data offers itself a movement analysis since panel data provides a comparatively easy way to observe changes over a period. Hence, the researcher utilized the results from the regression analysis to evaluate the extent of association between working capital management components and the profitability of the firms.

Because the study involved the use of secondary data, there were no participants. However, the researcher randomly selected 108 publicly held small manufacturing companies from 2011 to 2015 to replace the participants in this study. The sample selected in this study consisted of 108 publicly held small manufacturing companies with financial statements listed on the SEC Edgar website, which makes the data available to the public. Each of the small manufacturing companies had an equal chance of been selected. Financial statements contained all the pertinent variables from 2011 to 2015 to test the research hypotheses and answer the central research questions. These small manufacturing companies with number of employees between 500 and 1500 have average revenue between $10 million and $250 million.

Data Analysis

The study utilized SPSS v.24 to conduct data analysis to answer the research questions. The researcher conducted a nonexperimental, multiple regression analysis to examine the relationships between the average collection period, inventory conversion period, average payment period, and cash conversion cycle (IVs) and profitability (DV) of the firms. Indeed, the choice of a precise mathematical assessment rests on the study questions, the variables in the research study, and the level of measurement (Tabachnick & Fidell, 2013). The following analysis steps were followed: The study calculated the IVs and DVs from 2011 to 2015 in the Microsoft Excel spreadsheet. The archival financial reports data in the Microsoft Excel spreadsheet were imported into SPSS v.24 and averaged out. The study used the average of the data from 2011 to 2015. Descriptive analysis is usually the first method of analysis to convert raw data into a technique that makes the reviews easy to comprehend and interpret (Boesch, Schwaninger, Weber, & Scholz, 2013).

Butler et al. (2012) also noted that descriptive statistics is relevant to notice any irregularities in the data and to recognize the features of the data. Therefore, the descriptive statistics used in this study were frequency, mean, standard deviation, minimum, and maximum. To ensure that the data were cleaned from any potential outliers, the Mahalanobis distance regression was applied to control the presence of missing data and outlier (Leys, Klein, Dominicy, & Ley, 2018). The researcher verified the data for assumptions of parametric tests by analyzing statistical assumptions for multiple regressions to figure the normality and linear association between the DV and the IVs.

Additionally, the study established the homoscedasticity assumption and multicollinearity assumption tests. The scatterplot and the normal probability plot in the SPSS assisted the researcher in testing for normality, linearity, and homoscedasticity. Observed the multicollinearity and singularity by examining the correlation coefficients amongst the predictor variables obtained from the SPSS on the correlation matrix.

RESULTS

Consistent with the purpose, the study included 108 publicly held manufacturing small businesses financial statements from 2011 to 2015. These companies are listed on the SEC database and can be accessed by the public. The dataset was exported from Microsoft Excel to SPSS to obtain the results for the study. The results of the analysis are shared as Pearson correlation tables, descriptive statistics tables and figures, and multiple regression tables. The remainder of this chapter will include the sample description of the study, the testing of the hypotheses and the summary of the findings.

Description of the Sample

The research sample comprised 108 publicly held manufacturing small firms from 2011 to 2015 listed on the SEC website. The firms were chosen randomly. The small manufacturing companies have total revenue between $10 million and $250 million. The researcher used G*power v.3.1.9.2 with the effect size of 0.10, a significance level of .05, a desired statistical power of 0.90, and five tested predictors to determine the sample size and used SPSS v.24 to analyze the data. The financial data for the 108 companies were based on the average of the 5 years (2011-2015) of data for each of the 108 companies (see Table 1).

Table 1. Descriptive Statistics

Variable	*M*	*SD*	*N*
Operating profit	-839.9722	23111.22801	108
Working capital	49239.9711	46103.34846	108
Average collection period	65.4859	37.41501	108
Average payment period	57.2254	62.90045	108
Inventory conversion period	137.3206	99.05731	108
Cash conversion period	145.5815	105.59719	108

Hypothesis Testing

Before testing the hypotheses, the researcher tested for assumptions. Assumptions are research problems that researchers underestimate or accept with faith without confirmation (Tabachnick & Fidell, 2013). Philip and Chesler (2018) confirmed that assumptions are statements that help to relieve doubt in the credibility and validity of the study.

Assumptions Tested

Normality Assumption

The researcher performed normality testing to determine if the variables were very different from the standard normal distribution. Table 2 shows the skewness and kurtosis of the variables. If the kurtosis is close to zero, the data are normally distributed. As noted in Table 2, the kurtosis was not close to zero, indicating that the study data were not typically dispersed. However, an observation of the applicable histograms showed normal distribution, as seen in Figure 3.

Table 2. Skewness and Kurtosis of Variables

Metric	Statistic	*SE*
Skewness	2.100	.241
Kurtosis	4.441	.478

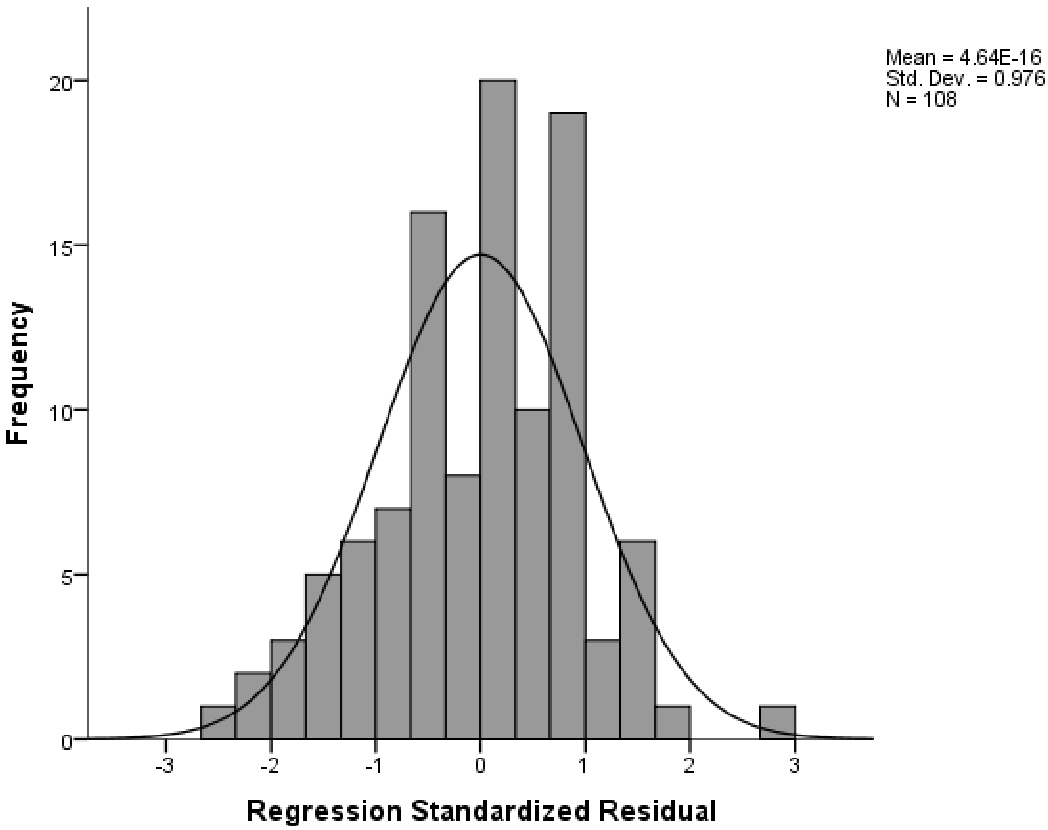

Figure 3. Histogram of normal curves for the variables.

Again, the test of normality was applied to determine the normality assumption. From Table 3, because the study's data point was less than 2000, the Shapiro-Wilk test of normality was used. Because the significant level was less than .05, the data were not statistically different from a normal distribution. Therefore, the researcher concluded that the data were normally distributed. However, because the Mahalanobis distance is not a typical normally distributed element, the variation of normality was not appropriately suitable because the Mahalanobis distance is always positively skewed.

Table 3. Tests of Normality

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	*df*	Sig.	Statistic	*df*	Sig.
Mahalanobis distance	.242	100	.000	.752	100	.000

Lilliefors significance correction

Linearity Assumption

The researcher used Figure 4 to test the linearity assumption. For linearity to be most evident, the diagonal or horizontal line should proportionally distribute the points. As shown in the figure, there was no visibility of a very curved pattern. Consequently, the data values were anticipated to be near to the diagonal line, indicating that there was no deviation of the expected values from the observed line. This statement suggests that the model does not make any methodical errors whenever it is generating an abnormally large or small projection. Hence, the researcher concluded that the linearity assumption was met.

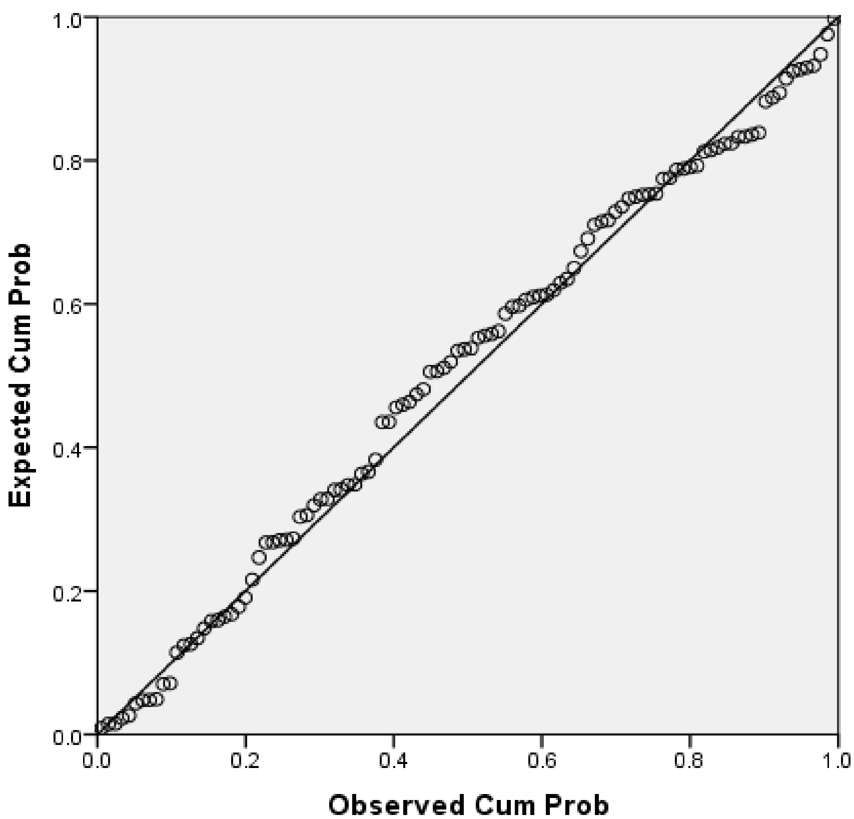

Figure 4. Normal P-P plot of regression standardized residual.

Multicollinearity Assumption

To ensure that the variables of interest were vitally linked, and strong relationships were not available for variables of interest, the researcher conducted a test of the multicollinearity assumption using the variance inflation factor (VIF) and tolerance. The multicollinearity assumption specifies that whenever the VIF value is greater than 10 or the tolerance is less than 0.1, multicollinearity is present (Tabachnick & Fidell, 2013). A low level of VIF is preferred over a higher level of VIF. As noted in Table 4, the values of VIF were less than 10, and the values of the tolerance were greater than 0.1. These results indicated that the multicollinearity assumption was not violated. SPSS automatically excluded the inventory conversion period (ICP) because the correlation between the ICP and the rest of the predictors was very high. Multicollinearity assumption states that a strong relationship should not be available for the variable of interests (Tabachnick & Fidell, 2013). Whenever a set of predictor variables are highly correlated, only one variable is included in the regression model, and the remaining are excluded (Yang, Xiang, Shu, & Yang, 2018). SPSS v.24 excluded the inventory conversion period to avoid perfect collinearity.

Table 4. Test of Multicollinearity

Model		Collinearity statistics	
		Tolerance	VIF
1	Working capital	.949	1.054
	Average collection period	.740	1.351
	Average payment period	.788	1.269
	Cash conversion cycle	.766	1.306

DV: Operating profit

Outlier. Every correlational analysis is deemed vulnerable to some outlier data. To effectively treat an outlier in the data, a researcher must require deleting, rescoring, or conduct data transformation (Tabachnick & Fidell, 2013). The researcher conducted a Mahalanobis distance method to identify the outliers in the dataset. The Mahalanobis distance method helped to define the chi-square (X^2) with a critical value of $p < .001 = 8.488$. This study has only 1 degree of freedom, and this indicated that all cases higher than 8.488 were outliers. The “if conditional” feature in SPSS was used to remove all data with outliers above 8.488. Table 5 shows the chi-square (X^2) with the highest cases removed as outliers (9.09974, 8.89804, 8.84778, 8.68627, and 8.50672).

Table 5. Extreme Values

			Case #	Value
Mahalanobis distance	Highest	1	12	9.09974
		2	35	8.89804
		3	89	8.84778
		4	61	8.68627
	Lowest	1	105	.03112
		2	83	.04240
		3	102	.04240
		4	32	.04872

Tables 6 and 7 indicate the data before and after outliers. Table 6 shows the data without the missing numbers, and Table 7 indicates the data after the missing numbers.

Table 6. Descriptive Statistics (With Outliers)

Variable	*M*	*SD*	*N*
Operating profit	-839.9722	23111.22801	108
Working capital	49239.9711	46103.34846	108
Average collection period	65.4859	37.41501	108
Average payment period	57.2254	62.90045	108
Inventory conversion period	137.3206	99.05731	108
Cash conversion period	145.5815	105.59719	108

Table 7. Descriptive Statistics (Without Outliers)

Variable	*M*	*SD*	*n*
Operating profit	-911.3600	23554.87419	100
Working capital	46120.3368	40616.55293	100
Average collection period	59.5607	26.59692	100
Average payment period	50.6002	32.42051	100
Inventory conversion period	123.0927	66.80577	100
Cash conversion cycle	132.0533	71.13789	100

Homoscedasticity

The researcher tested the homoscedasticity assumption and observed that the variation of the residuals is constant at every point of the predictor variables. As seen in Figure 5, the scatterplot was mostly overcast and could draw the square around the dots. Therefore, the homoscedastic assumption was met.

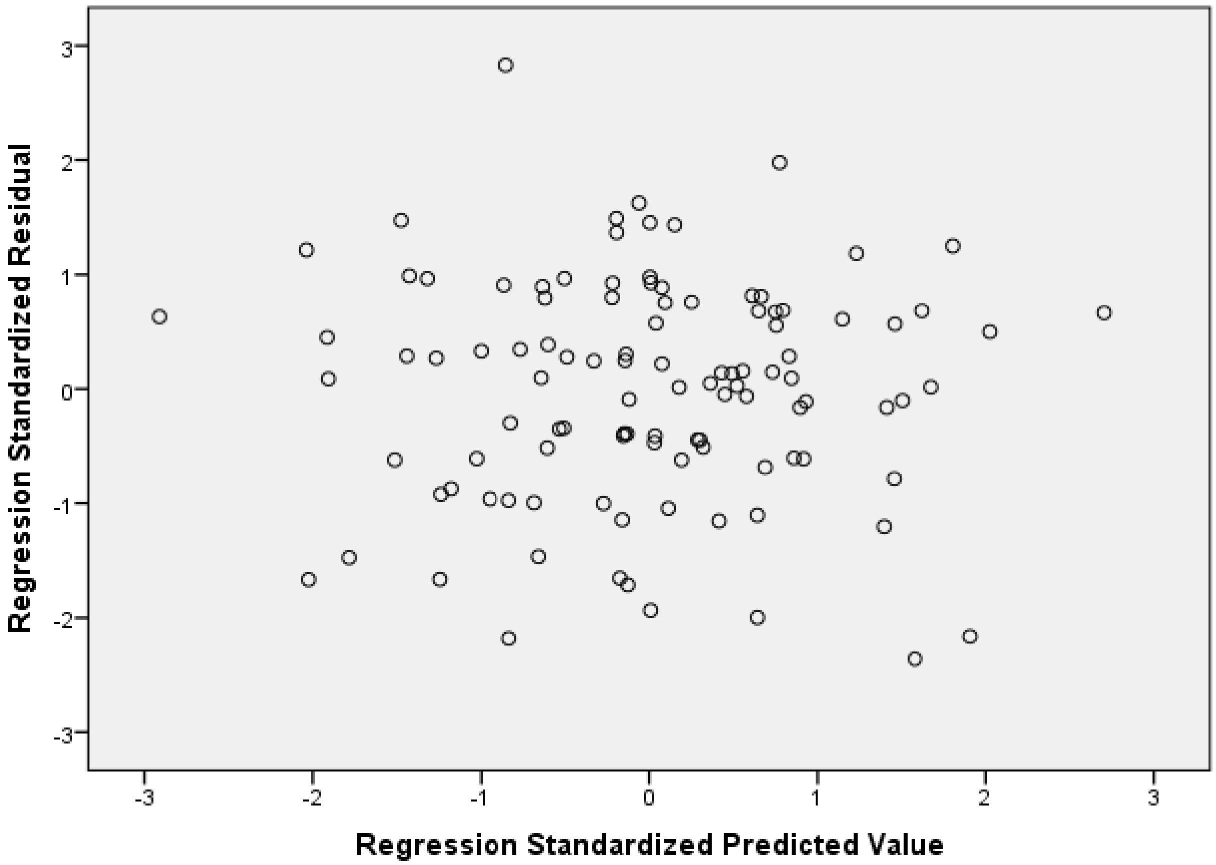

Figure 5. Scatterplot showing homoscedasticity. The scatter plot is showing the relationships between the IVs and the DV.

Pearson Correlation

To determine if there was a significant relationship between working capital management and profitability of small businesses (RQ1, SubQ1, SubQ2, SubQ3, and SubQ4), the researcher applied the Pearson correlation. Table 8 shows the Pearson correlation results. The *r* values of the Pearson's correlation cannot be equal to 0 but between -1 and +1. The figures showed that there was a strong association between working capital management and profitability (0.117), a strong relationship between cash conversion cycle and operating profit (0.063), a negative relationship between average collection period and operating profit (-0.195), and a negative relationship between average payment period and operating profit (-0.242).

Table 8. Pearson Correlation

		Operating profit (OP)	Working capital (WC)	Average collection period (ACP)	Average payment period (APP)	Inventory conversion period (ICP)	Cash conversion cycle (CCC)
Pearson correlation	OP	1.000	.117	-.195	-.242	-.012	.063
	WC	.117	1.000	.114	.162	.192	.124
	ACP	-.195	.114	1.000	.296	.184	.350
	APP	-.242	.162	.296	1.000	.320	-.190
	ICP	-.012	.192	.184	.320	1.000	.813
	CCC	.063	.124	.350	-.190	.813	1.000
Sig. (1-tailed)	OP	.	.114	.022	.006	.449	.258
	WC	.114	.	.120	.047	.023	.100
	ACP	.022	.120	.	.001	.028	.000
	APP	.006	.047	.001	.	.000	.024
	ICP	.449	.023	.028	.000	.	.000
	CCC	.258	.100	.000	.024	.000	.

Summary of the Hypothesis Testing

The researcher used multiple regression coefficients (see Table 9) to test the hypotheses for the stated research questions. The researcher tested all the five hypotheses using a 95% interval and a 5% significance level. The study failed to reject the null hypothesis when the *p* (sig) values in Table 9 were higher than the significant level of 5% ($p > .05$) and rejected the null hypothesis if *p* values were less than .05 ($p < .05$) significant level. Following is a summary of the hypotheses tested:

H

H_{01}. The working capital management does not statistically significantly explain the profitability of small manufacturing businesses.

H_{a1}. Working capital management does statistically significantly explain the profitability of small manufacturing businesses.

Subquestion 1. To what extent does the average collection period explain the profitability of small manufacturing businesses?

SubH_{01}. The average collection period does not statistically significantly explain the profitability of small manufacturing businesses.

SubH_{a1}. The average collection period does statistically significantly explain the profitability of small manufacturing businesses.

Subquestion 2. To what extent does the average payment period explain profitability of small manufacturing businesses?

SubH_{02}. The average payment period does not statistically significantly explain the profitability of small manufacturing businesses.

SubH_{a2}. The average payment period does statistically significantly explain the profitability of small manufacturing businesses.

Subquestion 3. To what extent does the inventory conversion period explain profitability of small manufacturing businesses?

SubH_{03}. The inventory conversion period does not statistically significantly explain the profitability of small manufacturing businesses.

SubH_{a3}. The inventory conversion period does statistically significantly explain the profitability of small manufacturing businesses.

Subquestion 4. To what extent does the cash conversion cycle explain profitability of small manufacturing businesses?

SubH_{04}. The cash conversion cycle does not statistically significantly explain the profitability of small manufacturing businesses.

SubH_{a4}. The cash conversion cycle does statistically significantly explain the profitability of small manufacturing businesses.

Table 9. Multiple Regression Coefficients

Model		Unstandardized coefficients		Standardized coefficients			95.0% CI for B	
		B	*SE*	Beta	*t*	Sig.	Lower bound	Upper bound
1	(Constant)	4453.482	5144.169		.866	.039	-5748.763	14655.728
	Working capital	.081	.048	.162	1.693	.043	0.000014	0.0000176
	Average collection period	-108.881	66.863	-.176	-1.628	.014	0.000488	0.0000725
	Average payment period	-74.603	38.543	-.203	-1.936	.050	0.000043	0.0000837
	Cash conversion cycle	14.493	23.291	.066	.622	.535	-31.700	60.686

DV: Operating profit

RESULTS

The research problem was centered on the relationship between working capital management and profitability of publicly traded manufacturing businesses. The study was conducted using a quantitative, nonexperimental research design. The five research questions with the hypotheses sought to address the gap in the literature on the link between the working capital management and profitability of publicly traded small manufacturing firms across the United States. Multiple regression analyses were used to ascertain the relationship between the IVs (working capital, average collection period, average payment period, inventory conversion period, and cash conversion cycle) and the DV (operating profit). Table 6 presented the descriptive statistics of the variables with initial 108 financial data measures. However, after removing the outliers, the data was decreased to 100 (see Table 7). The study consisted of the first five IVs (working capital, average collection period, average payment period, inventory conversion period, and cash conversion cycle) and the DV (operating profit). After running the data, SPSS v.24 excluded the inventory conversion period due to a high correlation.

As seen in Table 11 (model summary), the multiple correlation coefficient (R) was 32.6%, which showed a moderate level of prediction and, therefore, the model was fit for the researcher's data. In addition, the coefficient of determination (R^2) of 10.7% includes the IVs (working capital, average collection period, average payment period, and cash conversion cycle) that could account for the DV (operating profit) with 10.7%.

Table 11. Model Summary

Model	*R*	R^2	Adj. R^2	*SE* of estimate
1	.326[a]	.107	.072	22265.54326

a. Predictors: (Constant), CCC, WC, ACP, ICP
DV: OP

The ANOVA in Table 12 shows the results of the *F* test that was used to help determine if the model has no explanatory power or the IVs helped to predict the dependent variable. The *F* test (4, 103) was equal to 3.071, and the *p*-value (sig) .020 was less than .05. The researcher found that the coefficient of predictors (cash conversion cycle, working capital, average collection period, and average payment period) was statistically significantly different from zero. The results were used to establish a linear connection between the cash conversion cycle, working capital, average collection period, average payment period, and operating profit.

Table 12. ANOVA

Model		*SS*	*df*	*MS*	*F*	Sig.
1	Regression	6089083149.000	4	1522270787.000	3.071	.020[a]
	Residual	51062704910.000	103	495754416.600		
	Total	57151788050.000	107			

DV: Operating profit
a. Predictors: (Constant), CCC, WC, ACP, ICP

As shown in Tables 11 and 12, the regression was deemed suitable for the data. Therefore, the researcher generated the regression model for the omnibus question using the multiple regression coefficient table (see Table 9):

Operating profit = 4453.482+0.081WC-108.881ACP-74.603APP+14.493CCC, where WC = working capital, ACP = average collection period, APP = average payment period, and CCC = cash conversion cycle.

From the model, whenever working capital was increased by 1, it led to a 0.081 increase in operating profit. In the same vein, whenever the average collection period was increased by 1, it led to a 108.88 decrease in the operating profit. Conversely, whenever there was an increase by 1 in account payable, the resultant was 74.603 decrease in operating profit. Finally, whenever the cash conversion cycle was increased by 1, it led to a 14.493 increase in operating profit. Following is a discussion of the hypotheses and research questions tested:

Research Question 1/Hypothesis 1

One research question guided the study: To what extent does the working capital explain profitability of small manufacturing businesses?

Null Hypothesis 1 that the working capital does not statistically significantly explain the profitability of small manufacturing businesses. The results of the analyses were used to establish that the null hypothesis was rejected. As observed from the coefficients in Table 9, the working capital had *t* value of 1.693, which was less than 1.96. At the same time, it had a beta of 0.162 and a *p* value of .043, showing less than .05. Therefore, the researcher concluded that there was a significant relationship between working capital and profitability. The finding implies that the effective management of working capital can have a positive influence on the operating profit of small manufacturing businesses.

The results were that efficient utilization of working capital by the publicly held small manufacturing firms is more effective to drive higher profits. The findings showed that working capital are critical resources that firms must determine how to best distribute within the organization to achieve maximum benefits.

Subquestion 1/Subhypothesis 1

Subquestion 1. To what extent does the average collection period explain the profitability of small manufacturing businesses?

SubH_{01}. The average collection period does not statistically significantly explain the profitability of small manufacturing businesses.

SubH_{a1}. The average collection period does statistically significantly explain the profitability of small manufacturing businesses.

The results of the analyses rejected the null hypothesis. As seen in Table 9, the average collection period had a *t* value of -1.628, which was less than 1.96. At the same time, it had a beta of -0.176 and a *p* value of .014, showing less than .05. The conclusion was that because the *p* value (.014) was less than .05, the null hypothesis is rejected. Hence, there was a statistically significant relationship between the average collection period and operating profit.

The analysis supported the position that publicly held small manufacturing firms' operating profit was significantly associated with reducing the average collection period. Therefore, the finding was that a shorter average collection period has a positive influence on operating profit. With a shorter average collection period, funds will be available to make other payments on time and to conduct the daily operations of the business. The data and the assessment support a rigorous adherence to shorter accounts receivable influenced an appropriate level of profitability in the publicly held small manufacturing firms.

Subquestion 2/Subhypothesis 2

Subquestion 2. To what extent does the average payment period explain profitability of small manufacturing businesses?

SubH_{02}. The average payment period does not statistically significantly explain the profitability of small manufacturing businesses.

SubH_{a2}. The average payment period does statistically significantly explain the profitability of small manufacturing businesses.

The null hypothesis is rejected because based on the data analysis, there was statistically significantly relationship between average payment period and profitability of small manufacturing businesses. The analysis indicated that as payment of obligations delayed, so is the reduction of profitability. As seen in Table 9, the average payment period had a *t* value of -1.936, which was less than 1.96. At the same time, it had a beta of -0.203 and a *p* value of .050, showing equal of .05. The results indicated that a longer delay in paying creditors would result in a bigger reduction of profitability. The reduction in profit could be as a result of higher interest payments on payables once payments are delayed. The finding explains that the businesses that took early payment discounts would reduce their account payables.

Subquestion 3/Subhypothesis 3

Subquestion 3. To what extent does the inventory conversion period explain profitability of small manufacturing businesses?

Sub*H*$_{03}$. The inventory conversion period does not statistically significantly explain the profitability of small manufacturing businesses.

Sub*H*$_{a3}$. The inventory conversion period does statistically significantly explain the profitability of small manufacturing businesses.

The researcher did not test Hypothesis 3 because the predictor inventory conversion period was highly correlated among the other variables. Tabachnick and Fidell (2013) argued that if two or more variables have a high correlation, SPSS will remove the predictor variable that shows the higher VIF.

Subquestion 4. To what extent does the cash conversion cycle explain profitability of small manufacturing businesses?

Sub*H*$_{04}$. The cash conversion cycle does not statistically significantly explain the profitability of small manufacturing businesses.

Sub*H*$_{a4}$. The cash conversion cycle does statistically significantly explain the profitability of small manufacturing businesses.

As seen in Table 9. the t value (0.622) was less than 1.96, and the beta was 0.066. The p value (sig) indicated .535, which was higher than .05. This coefficient of the cash conversion cycle was not statistically significant. Hence, the researcher concluded that there was no significant relationship between the cash conversion cycle and the profitability of small businesses. Though the study established that there was no relationship between the cash conversion cycle and profitability of small manufacturing firms, reducing the cash conversion cycle could lead to positive cash flow and ultimately increase profitability. Based on this finding, the researcher is unable to support the findings in the previous study by Nwude et al. (2018), which established the significant relationship between the cash conversion cycle and profitability of small manufacturing firms. This finding is especially important for the current study, as positive liquidity enables firms to meet their daily financial obligations. Firms with a longer cash conversion cycle may require external financing for its daily operations.

Conclusions Based on the Results

The findings of the study are that there is a relationship between working capital, average collection period, average payment period, and profitability, while it also indicated there was no relationship between cash conversion cycle, and profitability. The results showed a diverse trend with previous studies reviewed. The researcher, therefore, deemed it appropriate to compare the findings with the theoretical framework and review of the previous literature to make conclusions based on the results.

Limitations

The first limitation of the study was that SPSS excluded the inventory conversion period due to the high correlation among the variables. The inventory conversion period is one of the critical components of working capital management to measure profitability, especially regarding manufacturing firms. Manufacturing firms require raw materials for production. Hence, determining the period to hold inventories to take advantage of cash inflows for working capital requirements is a useful finding.

Another limitation was that the study focused only on the examination of manufacturing firms. Other industries, such as construction, agriculture, financial services, and hospitality services, apply working capital management practices in their daily operations. This study did not provide a comparative analysis for findings across different industries. The use of one DV (operating profit) to determine profitability was another limitation of this study. There are several measures of profitability of companies. Companies can calculate profit through return on assets (ROA), return on capital, return on equity (ROE), operating profit, and earnings before interest, tax, depreciation, and amortization (EBITDA). The use of different measures of profitability can address the concerns of multiple stakeholders in the manufacturing industries.

Finally, the study was limited to publicly traded small manufacturing companies whose financial statements are published in the U.S. Security and Exchange Commissioned (SEC) Edgar website. Publicly traded companies are required to follow a strict regulatory requirement. Such requirements mandate firms to follow strict financial principles, as outlined in the General Accepted Accounting Principles (GAAP). The study would have been enhanced if the researcher had included privately owned manufacturing companies for comparison.

Implications for Practice

The findings of this study presented significant impacts for practice of both scholars and for practitioners. From the practitioners’ standpoint, the results of this study may lead to pragmatic managerial strategies for working capital management to improve profitability of firms. Managers of small manufacturing businesses can leverage the findings from this study to enhance the relationship between the components of working capital management and profitability. Although the study revealed that each element of working capital management might have a different influence on profitability, leadership must set specific target levels to meet shareholders’ needs. Second, the findings may guide practitioners and managers of small manufacturing businesses to concentrate more on the average collection period as a critical factor to establish optimal profitability. The shorter average collection period is an excellent predictor for describing the financial achievement of small manufacturing firms.

From a scholarly perspective, the study may significantly contribute to advancing working capital management theory and add to the existing knowledge in the field of finance. The findings, therefore, confirmed the current theory. The overall results showed that working capital has a vital effect on the profitability of small manufacturing firms and performs a crucial role in wealth creation for investors of small businesses. Scholars may use this study as a basis to conduct further research to consolidate the findings of this study and incorporate other factors that may impact the profitability of small manufacturing firms.

Recommendations for Further Research

This study was limited to only one measure of profitability (operating profit). Future research may advance to include other types of profitability. There are various measures of profitability of companies. Future research may combine ROA, ROE, operating profit, and EBITDA to measure the effectiveness of management of small manufacturing firms in generating profits. This is because EBITDA can improve operating profit by adding back depreciation and amortization into the firm.

Another area for further research is to conduct a similar study with privately owned manufacturing businesses. This study focused on publicly traded manufacturing small firms that adhere to strict financial reporting and regulations. The study also applied quantitative research methods in conducting the analysis. Private companies have the flexibility to influence their working capital policy and requirements. Further research into this area using qualitative methodology rather than quantitative methodology may provide the opportunity to compare results to better understand specifics associated with the relationship between working capital management and profitability of small manufacturing businesses.

Additionally, this study used secondary data from small manufacturing companies. Further research may be extended to large manufacturing companies for similar studies. Larger companies have access to more considerable funds and, therefore, a new study may provide a complete picture of the relationship between working capital management and profitability, particularly in the United States.

Finally, this study was limited to the examination of manufacturing firms only. Other industries, such as construction, agriculture, financial services, and hospitality services, apply working capital management strategies in their day-to-day operations. More particularly, hospitality industries maintain inventories for their daily operations. Further studies may examine the relationship between working capital management and profitability in hospitality industries to demonstrate a general confirmation of the association.

Conclusion

This study sought to examine the relationship between working capital management and profitability of publicly traded manufacturing small firms across the United States. The population for this research comprised 108 publicly small manufacturing companies listed on the SEC for the period from 2011 to 2015. The results of the nonexperimental design showed that there was a statistically significant relationship between working capital and profitability of small manufacturing companies, average collection period, and profitability. The researcher also found that there was no significant association between the cash conversion cycle and profitability. The study excluded one of the IVs (inventory conversion period) because of its high correlation with the other variables. The analysis of the findings established that efficient management of working capital by managers of small manufacturing companies could enhance firms' profits as reviewed in the previous literature. Additionally, the study uncovered that firms could maximize profits by shortening the number of days for accounts receivables. This strategy can help managers to create more cash flow for the daily operations of their firms.

Results included further explanations regarding the significance of working capital management components and the profitability of publicly held small manufacturing firms for shareholders and potential investors in decision making. While a small manufacturing firm with high levels of accounts receivables may show that the firm is having difficulty in the collection of its receivables, it could also indicate that the firm has a less rigorous internal policy to improve sales. Moreover, a shorter accounts payable period could suggest that the firm is not leveraging early payment discounts available to it, which would benefit the business. Therefore, balancing the average collection period and average payment period can quickly impact the cash flow, which also could influence the profitability of the firm.

Furthermore, the results of the study established that while higher inventory levels could help the firm to benefit from unanticipated requirements from customers, too much holding of inventories could incur additional costs to the firm. The results established that all the working capital components influenced the profitability of the 108 firms randomly sampled for the period 2011-2015. Hence, the firms always require effective management of all the working capital components identified in this study.

Although this study was not without limitations, the findings of the study may contribute to the body of knowledge and may assist future researchers in advancing the research on the relationship between working capital management and profitability of small manufacturing firms. Therefore, the researcher concluded that the findings in this study might be applied as useful strategies for efficient and effective working capital management. This study supports the significance of efficient working capital management to improve the profitability of small manufacturing firms.

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USING ARTIFICIAL INTELLIGENCE TO DETECT DISINFORMATION IN IN WEB GENRES

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ABSTRACT

In recent years, fake news has increased dramatically on social media and websites. This increase is due to the rapid flow of information, easy access and low costs offered by the Internet. Timely discernment of fake news and true news reduces the possibility that misinformation will influence public opinion, judgment, or conscience. Therefore, this study proposes models to identify fake news. We develop disinformation detection models using TF-IDF for feature extraction and five classifiers namely Decision Trees (DT), Gradient Boosting (GB), Linear Support Vector Machine (SVM), Logistic Regression (LR) and Random Forest (RF). For the evaluation of the models, two data sets corresponding to social media and websites web genres were used. The models were trained and evaluated using four metrics namely: Recall, Precision, F1-score and Accuracy were used in the evaluation process. When each type of web-genre models was evaluated and tested on data from the same web-genre, the website web genre models detected disinformation with the predictive accuracy rates ranging from 0.99 - 1.00; while the social media web-genre models detected disinformation with predictive accuracy rates ranging from 0.88 - 0.96. On the other hand, models for each type of web genre, was used to detect disinformation in a different web-genre. In this case the website web-genre models detected disinformation in social media with predictive accuracy rates ranging from 0.55 – 0.57 while the social media web-genre models detected disinformation in websites with predictive accuracy rates ranging from 0.48 – 0.55.

INTRODUCTION

Websites and social networks such as Twitter are some of the popular digital technologies for real-time global dissemination of information [1]. The popularity of these technologies has attracted cybercriminals who have continued to exploit these technologies to propagate disinformation in order to disrupt socio-economic and geo-political events around the world. For example, in 2016 the world witnessed for the first time how coordinated and sophisticated disinformation campaigns coordinated by foreign threat actors influenced the outcome of 2016 presidential elections in the United States [2]. While the volume of disinformation has continued to rise, there are reports on how disinformation in the form of false news can influence the decisions of individuals person or even social groups [3]. On the contrary, there is also a significant increase in the number of people accessing social networks and web platforms for news and knowledge [4]. This therefore makes content circulating on social media platforms and websites questionable due to the independence of freedom of expression that is exercised on these sites or platforms.

Social media and online communities generate a lot of misleading information on the Internet. This type of information has had a profound negative impact on communities and socio-economic programs and activities [5]. The lack of systematic efforts by these platforms to moderate posts contributes to the uncontrolled dissemination of misinformation [6]. Furthermore, it has been shown that fake news can go viral in seconds or minutes [7]. Therefore, identifying and discriminating between fake news and true news is a difficult challenge for today's detection systems [8]. Online fact-checking systems such as FactCheck.org and PolitiFact.com use manual content verification approaches which are time-consuming and infeasible given the exponential increase in volumes of content which is published online [5].

In recent years, investigations aimed at detecting fake news have been developed to help online users identify real information. This process is more difficult because false information is intentionally written to mislead readers [10]. To solve this problem, some efforts have been developed from the machine learning approach to counteract this damaging event [11] [12]. Despite efforts to detect fake news on the Internet, the dissemination of fake news from online platforms has not been stopped, nor has the harmful effects that this type of information can cause have been reduced. The main reason is that there is no system that can control fake news with little or no human involvement. Experimental analysis shows that learning algorithms have managed to detect fake news, because they are trained from an initial set of cases [9]. Added to this is the limited availability of high-quality training data to train supervised learning models. Therefore, both the industry and the academic world contribute to the construction of mechanisms to combat fake news online. It is important to design effective, automatic and applicable approaches to detect fake news online [5].

Various classification methods have used text mining [9] [10] or supervised artificial intelligence algorithms [11] [12] to detect fake news. However, the mechanisms for detecting fake news are limited to some conventional machine learning methods. Furthermore, a mechanism that employs artificial intelligence algorithms to detect fake news can be improved by using different configurations and components [13]. Machine learning approaches tend to produce higher precision; therefore, it is considered a tool that could assess the authenticity of tweets and platform news using specific training features [14] [15] [16].

The primary research question which this paper explores is, *how can we use machine learning to detect disinformation published in web genres like websites and social media?* This study proposes a model that uses Artificial Intelligence (AI) algorithms to detect disinformation in the form of fake news. For this, techniques have been used for data cleaning and preprocessing and extracting features for the detection models. This research also evaluates various Machine Learning (ML) techniques to show which models achieve better results. The proposed model with different classifiers has been evaluated using two datasets: one of the datasets was collected from a social media platform and the other from website. In this study, these two data sets were analyzed using a set of performance metrics explained in the following sections.

The rest of the paper is organized as follows: section 2 is the literature review, which deals with the detection, approaches and characteristics used by the different researchers who are investigating fake news. Section 3 presents the methodology of our proposed model. The results of the model and their analysis are presented in Section 4. Finally, Section 5 presents the conclusions of the investigation.

LITERATURE REVIEW

Fake news detection

The term "Fake news" was used after the presidential elections in the United States in 2016 due to the unverifiable content that circulated during the election period in order to skew the electoral results. Therefore, fake news is spread by passing as authentic news published through the media or the Internet with the intention of affecting an agency, entity or person or obtaining economic or political benefits [1]. In order to detect fake news present in reviews, comments, publications on social networks and messages, approaches based on content, functions, behavior and graphics are used [17].

Fake news changes the way people interact with real news. Most fake news is intentionally created to mislead and confuse social media users [18]. Some examples are the rumors that spread on Twitter of the 2010 earthquake in Chile, which increased public panic and chaos [19]. There was also a Cable News Network (CNN) story shared on Facebook that misleadingly disclosed inaccurate television rating data [20].

However, the detection of fake news presents challenges such as the variety of data, identification of the latest fake news from data of time periods, origin recognition, among others, which must be handled while the detection is taking place. When spotting fake news, it's important to differentiate between deliberate deception and irony. These two aspects differ from the author's intention. The differentiation between these concepts is sometimes difficult for humans, much more for a detection system that must do it automatically [8].

Existing research approaches

Fake news detection approaches focus on looking for systematic patterns embedded in news content [1]. Ahmed et al., [21] use six supervised machine learning classifiers SVM, Lagrangian Support Vector Machine (LSVM), k-nearest neighbors (KNN), DT, Stochastic gradient descent (SGD), LR to detect fake reviews of hotels and fake news articles on the web using text classification. Their experiments achieve an accuracy of 90% and 92% respectively.

Pérez-Rosas et al., [22] used models with 2,131 attributes comprising fake news and legitimate news to find linguistic differences between the two. This approach achieved 78% accuracy in detecting fake news in two different data sets using a linear SVM classifier. Jin et al., [23] used five visual characteristics and seven existing statistics and user characteristics to train the SVM model, Logistic Regression, K-star, and Random Forest. This approach scored 83.6% employing four-fold cross-validation.

Text content and approaches using logistic regression and random forest are used to detect bias and check credibility. The content-based model improves the detection of biases, because it shows patterns in the text of the dataset [24]. Yang et al., [25] proposed a model called Text Image Convolutional Neural Network (TI-CNN) focused on explicit and latent features extracted from text and images using CNN. J. Zhang et al., [26] developed a fake news detection deep broadcast network model employing hybrid feature extraction. This model learns characteristics based on the most used words extracted. Ma et al., [27] use recursive neural networks to train the basic tanh-RNN model and then use LSTM-1, GRU-1 and GRU-2. This model achieves an accuracy of 91%.

Nasir et al. [12] present an artificial neural network-based approach to fake news detection. These models tend to work well on a specific data set, but they do not generalize well. In [28] propose a deep learning algorithm with an accuracy of 99.4%, however the experimental results revealed that the approach is successful on the user side with the Chrome environment on Facebook posts. Whereas Goldani et al. [29] uses capsule networks for the detection of fake news. This study proposes two architectures for different lengths of press releases and two strategies to improve the performance of capsule networks. A machine learning-based fake news detection model using a supervised approach was proposed by Hakak et al. [30]. To do this, they used data sets for training and testing using decision trees, random forest, and additional tree classifiers.

Features for fake news detection

Fake news has fewer words and sentences than real news and is spread as tweets and hyperlinks on social media without headlines. Other attributes of fake news include use of more exclamation marks, capital letters, and question marks and shows negative sentiment. Also, the images that accompany fraudulent posts are often irrelevant; they display vague information and are of very low resolution [25].

Pérez-Rosas et al., [22] build models for automated online fake news detection using linguistic features and machine learning. The linguistic features used in generating the detection models consist of punctuation features, categories of psycholinguistic processes, psycholinguistic features, psychological processes, readability features and syntax features. The models are generated novel datasets from two domains namely: FakeNewsAMT and CelebrityNews, both of which were from the website genre.

Krishnamurthy et al., [31] used deep learning to study detection of deceptive and truthful content in court-room trial videos. The dataset used in generating the models comprised 121 videos. Four unimodal models consisting of video features, audio transcript, text audio features and facial micro-expression features were evaluated when generating the multi-modal deep learning models.

Shu et al., [3] evaluate the characteristics of the social media user profiles of experienced and naive users to improve the detection accuracy of fake news. Several researchers use characteristics extracted from the content of the text to carry out the detection process [25] [26] [32] [33]. For this they use characteristics such as: number of characters [34], number of words [25] [34], number of sentences [25] [34], special symbols [25], negations [25] [34], textual connectors [25], personal pronouns [25], analysis of sentiments of texts [25] [32] [33] [34], sight words [26], subsequence of elements [9].

Other outstanding works are Sahoo and Gupta [28] who analyze in their approach both the user profile and the characteristics of the news content. Goldani et al. [29] detects long or medium length news text. Four parallel capsule networks are then used to extract different n-gram characteristics from the input texts. Hakak et al. [30] used in its approach linguistic characteristics such as number of words, number of characters, number of sentences, average word length, average sentence length and characteristics based on the recognition of name entities.

Evaluation analysis of the current works

There are evaluation criteria used to determine the truthfulness of the news. One study used experimental results to detect biases, as well as patterns and peculiarities in the features used to detect fake news. This evidence is relevant because fake news authors use a different writing style to convince readers [35].

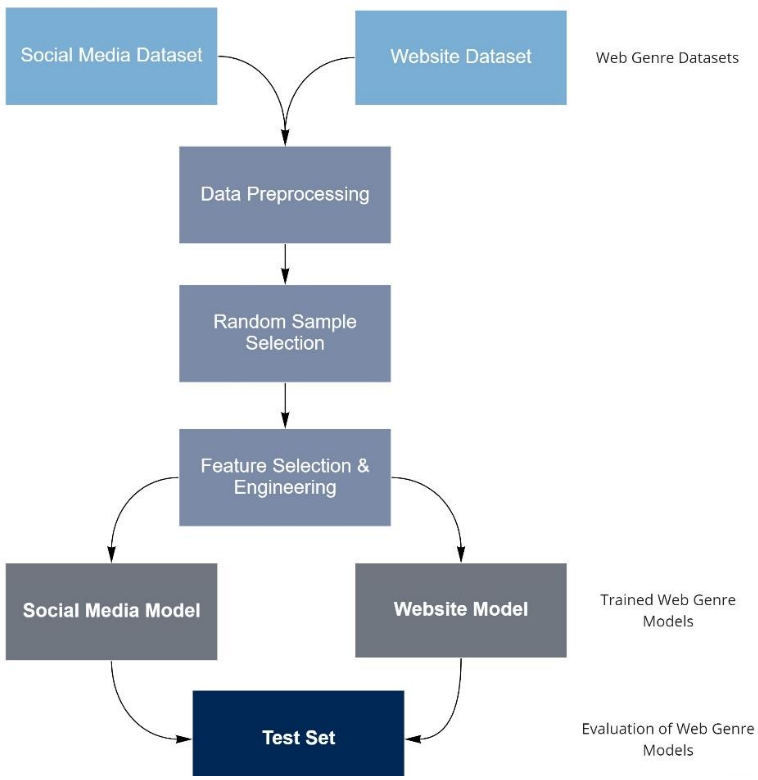
Fake news detection models use many evaluation criteria to assess different machine learning techniques. The most common metrics are Accuracy (Pr), True Positive (TP), True Negative (TN), False Positive (FP), False Negative (FN), False Positive Rate (FPR), False Negative Rate (FNR), Recall (Re), F-score and Accuracy (Acc). TP, TN, FP, FN corresponds to Detected Fake News, Detected True News, Misclassified True News, and Undetected Fake News [5].

The formulas to calculate these evaluation metrics are: $Pr = \frac{TP}{TP+FP}$; $Re = \frac{TP}{TP+FN}$; $FPR = \frac{FP}{FP+TN}$; $F - score = \frac{2*Pr*Re}{Pr+Re}$; $Acc = \frac{TP+TN}{TP+TN+FP+FN}$

METHODOLOGY

This section covers dataset, data preprocessing, term frequency description (TF), term frequency-inverse document frequency (TFIDF) and machine learning algorithms. The elaboration process of each model is detailed below in Figure 1.

Figure 1. Structure of the proposed model



Dataset

The datasets were public and are extracted from kaggle.com. For experimentation, the dataset was divided into 80% for training and 20% for testing.

- Social Media Dataset: This dataset was extracted from the Twitter platform and is made up of 20,800 tweets. After a data cleaning, where missing values were eliminated, 20,387 tweets were obtained. These tweets are about news from the 2016 US political campaign. The dataset which was balanced, comprised of fake news and truthful news. This dataset was organized into five columns which are: id, title, author, text, classification label.

- Website Dataset: The dataset comprised topics related to politics and the world. The data correspond to news published between August and December 2017. This dataset contains 21,417 truthful news and 23,481 fake news. The data stored in this dataset was collected from leading major newspapers. The data was also organized into four columns: title, text, subject, and date. Table 1 shows the categorization of the posts in the website dataset.

Table 1: Composition of website web genre dataset

Category	Number of news items	Fake	True
politicsNews	11272	0	11272
worldnews	10145	0	10145
News	9050	9050	0

politics	6841	6841	0
left-news	4459	4459	0
Government News	1570	1570	0
US_News	783	783	0
Middle-east	778	778	0
Total	44898	23481	21417

Text Pre-Processing

In this work, the title and body of each article were tokenized. To do this, we removed the empty spaces, and words less than three characters, because these words have less meaning in context. This process was carried out in order to obtain the set of valid words. We cleaned up the new data set by removing special characters like back slashes, punctuation marks, square brackets, braces among others. Finally, we obtained a set of data, which from a linguistic perspective are semantic representations that can be analyzed.

Feature selection

As observed in the previous section, this work improves the accuracy of the model by eliminating unrelated and redundant characteristics. In addition, Term Frequency-Inverse Document Frequency (TF-IDF) was used to transform the text into a meaningful representation of numbers in order to adjust the machine's algorithm for prediction.

TF-IDF was used in this research because it allows selecting root terms in data sets whose frequency is greater than the threshold. The words in the data set for each story have been weighed and each story has been converted into a vector of term weights. Finally, each word was represented by a value that indicates the weight of the word in the document. Term Frequency (TF) has been used in this proposal to identify the number of times a word appears in a document. In the end, TF calculates the weight of each word in each document. TF is defined as the counting function:

$$tf(t,d) = \sum_{x\in d} fr(x,t) \text{ where the } fr(x,t) = \begin{cases} 1, if\ x = t \\ 0,\ otherwise \end{cases} \quad (1)$$

Inverse document frequency (idf) is calculated:

$$idf(t) = log\frac{|D|}{1 + |\{d: t \in d\}|} \quad (2)$$

Where $|d: t \in d|$ is the number of documents where the terms t appears, when the term frequency function satisfies $tf(t,d) \neq 0$, we are only adding 1 into the formula to avoid zero division.

The formula for the $tf - idf$ is then:

$$tf - idf(t) = tf(t,d) * idf(t) \quad (3)$$

Classification Models

Detecting fake news requires extensive experimentation so machine learning techniques are used on a range of data sets. Techniques must understand the nature of fake news and how it spreads around the world. Therefore, the artificial intelligence algorithms used in this research are trained with fake news data sets extracted from news portals and social media. Initially, the labels of the instances in the data sets were identified. The monitored data is instantiated by the function returned by the tagged data training set. The task of the function is to evaluate the output and the minimum error rate of the input.

- Logistic Regression: In this work, a broad base of a set of characteristics extracted from the text is used, the output of which is binary (true / false or true / fake or 1/0). LR model is used because it provides an intuitive equation to classify problems into binary or multiple classes [36]. Therefore, LR was adjusted to obtain the best result for all individual data sets. In addition, multiple parameters were tested before acquiring the maximum accuracies of the LR model. The logistic regression function can be defined as follows:

$$(x) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 x)}} \tag{4}$$

  Logistic regression transforms the output into a probability value. This function aims to minimize cost to achieve optimal probability. The cost function is calculated as follows:

$$Cost\ (h_\theta(x), y) = \begin{cases} log\big(h_\theta(x)\big), & y = 1, \\ -log\big(1 - h_\theta(x)\big), & y = 0. \end{cases} \tag{5}$$

- Decision Tree: It contains a set of decision nodes that start at the root. In this research, the decision tree was used because it allowed easy interpretation, efficient handling of outliers and avoided linear separation of classes. The decision tree allows the most important variables to be identified and describes the relationship between the variables accurately. In addition, it contributed to the construction of new variables and characteristics, which predicted the target variable quite efficiently. The decision tree recursively selects features and splits the data set into those features. This research measures the quality of a division using the criteria "gini" for Gini impurity and "entropy" for information gain. So, to find the best division use:

$$G = \sum_{i+1}^{C} p(i) * \big(1 - p(i)\big) \tag{6}$$

  Where $p(i)$ is the probability of class i in the current branch. The impurity is reduced by selecting the best division. The entropy is calculated using the following formula:

$$E = -\sum_{i} pi * \log_2 * pi \tag{7}$$

- Gradient Boosting: It is effective at reducing bias and variance. Gradient Boosting with optimized parameters works best for a multi-class fake news dataset. In increasing gradient, each predictor corrects the error of its predecessor. Each predictor is trained using the residual errors of the predecessor while the weights of the training instances are not modified. This technique generates a prediction model in the form of a series of weak prediction models, usually in the form of decision trees. Therefore, to find the residual it would be: $Residual = Observed - Predicted$

  The most common form of transformation used in Gradient Boost for Classification is:

$$GB = \frac{\sum Residual}{\sum[PreviousProb * (1 - PreviousProb)]} \tag{8}$$

The numerator in this equation is the sum of the residuals on that sheet. The denominator is sum of (previous prediction probability for each residual) * (1 - same previous prediction probability).

- Random Forest: RF consists of a large number of decision trees that work individually. The final prediction is based on a class that got the most votes. The error rate is low due to the low correlation between trees [37]. The algorithm decides a division in a decision tree based on the regression or classification problem. RF in training allows the application of the bagging method, which allows the algorithm to be trained repeatedly. This bagging method randomly and repetitively selects the same dataset K times. The trees are trained with the same information; therefore, the result is formed by the individual predictions mi of each tree in the set, the equation is used:

$$\widehat{m} = \frac{1}{K}\sum_{k}^{i=1} \text{mi} \tag{9}$$

- Support Vector Machine: In this research, linear kernel SVM was used to solve the classification problem. A data is mapped in the model to assign this data to a space and predict the category to which it belongs. Therefore, this kernelized SVM model converts the input data space to a higher dimensional space. Next, the linear kernel function used in this investigation is observed:

$$k(x_i, x_j) = x_i * x_j \tag{10}$$

The following algorithm is used on all candidate points to locate them in space, where x_1 represents the coordinates of any point as a column vector.

$$Distance = \frac{|w^T x_1 + b|}{\|w\|} \tag{11}$$

Where $\|w\|$ is the magnitude or the length of the weight vector.

Methods and tools

In the implementation of the proposed models, the Python language was used under the Anaconda platform. In addition, the Jupyter tool was used to write and execute the training and evaluation of the models. Table 2 shows the classifiers used for each case and the calibration used in each case.

Table 2: Classifier settings

Classifier	Setting
Logistic Regression Classifier	penalty=l2; dual=false; tolerance=1e-4; Inverse of regularization strength=1; bias=true; intercept=1; weights associated with classes=none; maximum number of iterations=100
Decision Tree Classifier	criterion='gini', splitter='best', max_depth=None, min_samples_split=50, min_samples_leaf=1, min_weight_fraction_leaf=0.0, random_state=None, max_leaf_nodes=None, min_impurity_decrease=0.0, ccp_alpha=0.0
Gradient Boosting Classifier	loss='deviance', learning_rate=0.1, n_estimators=100, subsample=1.0, criterion='friedman_mse', min_samples_split=100, min_samples_leaf=1, min_weight_fraction_leaf=0.0, max_depth=3, verbose=0, warm_start=False, validation_fraction=0.1, n_iter_no_change=None, tol=0.0001, ccp_alpha=0.0

Random Forest Classifier	n_estimators=100, criterion='gini', max_depth=None, min_samples_split=2, min_samples_leaf=1, min_weight_fraction_leaf=0.0, max_features='auto', bootstrap=True, oob_score=False, verbose=0, warm_start=False, class_weight=None, ccp_alpha=0.0, max_samples=None
Linear Support Vector Classification	penalty='l2', loss='squared_hinge', dual=True, tol=0.0001, C=1.0, multi_class='ovr', fit_intercept=True, intercept_scaling=1, verbose=0, random_state=None, max_iter=100

RESULTS AND ANALYSIS

In this article, models using five different classifiers were evaluated. For this, the Accuracy, Recall, Precision and F1-score metrics will be used. They will be applied to the experiments carried out with the machine learning models RF, GB, DT, LR, Linear SVM. The results obtained by the models using website dataset and social media dataset are shown in Table 3 and Table 4 respectively.

Table 3: Classifier evaluation metrics using website web genre dataset

Classifier	Precision	Recall	Accuracy	F1-score
Decision Tree	1	1	1	1
Gradient Boosting	1	1	1	1
Linear SVM	1	1	1	1
Logistic Regression	0.99	0.99	0.99	0.99
Random Forest	0.99	0.99	0.99	0.99

Table 3 shows the results obtained by the proposed model using different classifiers according to the metrics used to evaluate these models. In it, it is observed that the DT, GB, SVM classifiers obtain 1 in the four-evaluation metrics Accuracy, Recall, Precision and F1-score according to the classification report. While the LR and RF classifiers show 0.99 in the four metrics according to the classification report.

Additionally, the score of the classifiers DT (0.9966), GB (0.9959), SVM (0.9956) was calculated, which obtained scores close to 1.00. While the classifiers LR (0.9867) and RF (0.9899) show scores close to 0.99. These results show that the DT, GB, SVM, LR and RF classifiers, after a data cleaning and processing process, are ideal for accurately identifying fake news and real news extracted from websites.

Table 4: Classifier evaluation metrics using social media web genre dataset

Classifier	Tweets	Precision	Recall	Accuracy	F1-score
Decision Tree		0.88	0.88	0.88	0.88
Gradient Boosting	Fake	0.94	0.92	0.93	0.93
	True	0.92	0.94		
Linear SVM		0.96	0.96	0.96	0.96

Logistic Regression		0.94	0.94	0.94	0.94
Random Forest	Fake	0.89	0.94	0.91	0.91
	True	0.93	0.88		

The results obtained by the evaluation metrics by the proposed models are observed in Table 4. This table shows that DT obtained 0.88 in the four-evaluation metrics. GB scored 0.94 on Fake News and 0.92 on Real News on Accuracy and scored 0.92 on Fake News and 0.94 on Real News on Recall respectively. Likewise, GB got 0.93 in both Precision and F1-score. SVM scored 0.96 and LR scored 0.94 on the four-evaluation metrics. Finally, RF achieved 0.89 Accuracy and 0.93 in fake news and real news respectively. Also, RF reached 0.94 and 0.88 in fake news and real news respectively. Furthermore, RF reached 0.91 in Precision and F1-score.

The results also show that the model whose classifier is SVM obtains 0.96, making it the best to identify false news and true news from social networks. Social media posts add an extra dimension to the discovery task. Therefore, the rest of the classifiers reach percentages lower than 0.94 (LR), because the publications on social networks add more semantic information, which implies a reduction in their detection rate. The SVM classifier with a linear kernel, added to the proposed model, receives the input and transforms it into a high-dimensional space where the input becomes more separable. Social media posts and website news can be classified into corresponding classes with high precision.

Table 5: Classification report of the model trained with website data and evaluated with social media data

Classifier	**News**	**Recall**	**Precision**	**F1-score**	**Accuracy**
Decision Tree	Fake	0.97	0.56	0.72	0.56
	True	0.01	0.18	0.02	
Gradient Boosting	Fake	0.93	0.57	0.71	0.56
	True	0.06	0.41	0.11	
Linear SVM	Fake	0.98	0.57	0.72	0.56
	True	0.04	0.54	0.07	
Logistic Regression	Fake	0.99	0.54	0.72	0.57
	True	0.02	0.62	0.03	
Random Forest	Fake	0.96	0.56	0.71	0.55
	True	0.03	0.35	0.05	

Table 5 shows the results obtained from the fake news identification model trained with news from website web genre and evaluated with social media data. It is observed that Recall, which is the metric that indicates the ability of the classifier to find all the true positive data, shows the highest results in the detection of false news and presents the following data: DT (0.97), GB (0.93) , SVM (0.98), LR (0.99) and RF (0.96).

According to the Recall results, the proposed model identifies the fake publications for social media with high validity, in the measure of each one of the evaluated classifiers. Furthermore, these results show that the model identifies a Twitter post as fake with Precision between 0.54 - 0.56 and Accuracy between 0.55 - 0.57 in each classifier. It is also observed that F1-score in a range of 0.71 - 0.72 because the Precision metric intervenes in its calculation. These results are due to the great linguistic variety that the so-called "tweets" cover. Therefore, the model trained with data from websites can effectively identify fake news.

Table 6: Classification report of the model trained with social media data and evaluated with website data

Classifier	**Tweet**	**Recall**	**Precision**	**F1-score**	**Accuracy**
Decision Tree	False	0.57	0.53	0.55	0.51
	True	0.45	0.49	0.47	
Gradient Boosting	False	0.11	0.56	0.18	0.49
	True	0.91	0.48	0.63	
Linear SVM	False	0.09	0.62	0.16	0.50
	True	0.94	0.49	0.64	
Logistic Regression	False	0.02	0.57	0.04	0.48
	True	0.98	0.48	0.64	
Random Forest	False	0.01	0.61	0.02	0.48
	True	0.99	0.48	0.65	

The results of the model trained with social media data and evaluated with social media news are shown in Table 6. The table shows that the model in the GB (0.91), SVM (0.94), LR (0.98) and RF (0.99) classifiers) score highly on the Recall metric for identifying true news. While DT indicates 0.57 in identifying false news and 0.45 in true news, which indicates effectiveness in locating false news. The table shows the results of the Precision metrics in false news with thresholds of 0.53 - 0.62 and in true news 0.48 - 0.49 and Accuracy in false news with a threshold of between 0.48 - 0.51 according to each classifier.

Finally, the F1-score results are observed to have between 0.63 - 0.65 in false news detection. DT in the same metric shows in false news 0.55 and in true news 0.47. The results are the product of the linguistic variety of the training data tweets as opposed to news published on websites. Furthermore, these results show that this model trained with tweet data allows identifying fake news with greater efficiency in contrast to the model trained with data from websites that allows identifying false news efficiently.

There are two key findings in this paper. Firstly, our results on disinformation detection reveal that the website models performed better than social media models in detecting disinformation with the same web-genre because websites contained more quantity of words hence the website genre models continued to improve in detecting disinformation as they encountered and learned from more examples. However, when the models in each of the web-genres were evaluated and detect disinformation from a different web-genre, models from both web genres did not generalize well. The reason why the models failed to generalize well in across web-genres using TF-IDF feature selection may be attributed lack of lexical diversity in disinformation especially fake news.

CONCLUSION

The problem of fake news and its consequences in society has attracted a lot of attention in recent years. For this reason, fake news detection methods are continually evolving. This research presents a fake news detection model using artificial intelligence techniques. For this, fake news detection models were developed that were evaluated using the DT, GB, LSVM, LR and RF classifiers. In addition, two data sets were used for the validation process, the first data set consists of website news and the second data set contains social media posts. The evaluation found that fake news data sets have many characteristics, most of which are irrelevant and redundant. So reducing the number of functions is one of the main points of this proposal, because this process helped to improve the precision of the classification algorithm.

This document proposes the TF-IDF method for the feature selection process, which helped to improve the model results. The two sets of characteristics (websites and social networks) were evaluated by five classifiers proposed in this research (DT, GB, LSVM, LR and RF). Results from the website's news dataset show that the DT, GB, and SVM classifiers score the highest on all four-evaluation metrics at 1.00. Additionally, LR and RF scored 0.99 with the same metrics, indicating that all four classifiers allow for an optimal news classification model. SVM is the machine learning technique that had the best performance in the ranking of social media posts with 0.96 in the four-evaluation metrics. SVM is more accurate on social media data sets because it uses a linear kernel with a high-dimensional spatial approach.

This research also evaluated the models by training them with data from social media and evaluating them with data from websites. In addition, they evaluated the trained models with website data in social media test sets. The results showed that the models correctly identify true data and false data according to the Recall metric. This metric indicates the ability of the classifier to find all true positive data. Precision and F1-score obtain a medium score in the detection of true news and false news because there is great linguistic variability. Accuracy presents a medium score due to the aforementioned, in addition the results of the Precision metric influence its calculation.

For future work, we plan to extend this work by looking at feature selection and engineering as well as optimization techniques to improve generalizability of the fake news detection models across more web genres.

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Using *Remember the Titans* as a Tool to Teach Bruce Tuckman's Five Stages of Group Development to Management Students

Abstract

This is an ongoing research project to quantify classroom performance improvement by utilizing the movie *Remember the Titans* as a tool to teach Bruce Tuckman's five stages of group development. Results data has been gathered during the previous three years and performance improvement has been achieved.

Group development and team building is an important aspect of managerial pedagogy, especially to undergraduates. Bruce Tuckman's model of group development, proposed in 1965, includes five stages. The stages include Forming, Storming, Norming, Performing, and Adjourning, which are easily explained using scenes from the movie *Remember the Titans*.

Using the movie as an instructional tool has proven effective as performance improvement has been realized in the undergraduate fundamentals of management classroom. This presentation intends to introduce the usage of the pedagogical approach and present the ongoing results.

WHAT IS EQUITY, WHEN, YEARS AFTER IT PURCHASES A NOTE, PENNYMAC, AS CREDITOR, SUES TO REFORM THE DEED OF TRUST SECURING THE NOTE?

A Case Study

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ABSTRACT

The Anglo-American system of equity jurisprudence is not infallible. There are many traps for the unwary that are easily exploited by unscrupulous persons who (a) are more knowledgeable of such a system and (b) have greater resources. A court has equity jurisdiction to reform a written contract, as long as one of the parties to such written contract alleges that the written contract does not embody the agreement between the parties due to a mutual mistake. This doctrine of equitable reformation is "*a doctrine for the legally maladroit*." *Baynes, infra*. The objectives of this article are to (1) establish the law with regard to an equitable reformation claim, (2) apply said law to the factual background of a case study, for the purpose of demonstrating that the equitable reformation claim of PennyMac in the case study is meritless and only brought for an evil motive. This article argues that if the objectives of this article are satisfied, PennyMac, and a multitude of its stakeholders, will have an increased understanding that PennyMac's current conduct in operating its loan servicing business may result in violations of a variety of state common laws and federal statutory laws. Furthermore, this article argues that such increased understanding, and the implications thereof, will likely motivate PennyMac to modify its business model in operating its loan servicing business, which will result in imminent changes to the manner in which PennyMac conducts its loan servicing business.

INTRODUCTION

> "If there is anything that takes the professional sweat off a dirt lawyer's brow, or places a smile on a malpractice carrier's face, it is the **equitable safety net of reformation**, definitely *a doctrine for the legally maladroit*. It has to be admitted that one of the main reasons we trial lawyers exist in the commercial law arena is to **extricate our dirt lawyer partners from chaos caused by the complex transaction documents they create**." Bold and italics added.
>
> Baynes, Vol. 78, No. 9 **Florida Bar Journal** 58 (October 2004).

As Baynes suggests, "reformation" of a written contract (e.g., Deed of Trust) is an "equitable safety net" in the arsenal of an attorney to be employed as a last resort - when all else fails. Ideally, however, a court cannot impose contractual terms upon parties (to a reformed written contract) who did not agree to such terms. Again, ideally, under this "equitable" "doctrine," a court is constrained to impose only those contractual terms previously agreed upon by the parties, but not embodied in the written contract due to a mutual mistake. Accordingly, "reformation" of a written contract presumes (1) the existence of a written contract whose contractual terms (a) failed to express the actual oral agreement between the parties, but (b) was intended to do so, and (2) the existence of an actual oral agreement between the parties, which (a) was made before the written contract was prepared and (b) was intended to be embodied in the written contract. Furthermore, to ensure the integrity of a court decision within the scope of this endeavor, evidence of such contractual terms must be "clear and convincing." This "clear and convincing" standard of proof is necessary because the doctrine of "reformation" ignores many legal norms of contract law (e.g., the statute of frauds and allowing parol evidence to modify a written instrument's language) in its quest to identify the actual agreement between the parties.

Notwithstanding the forgoing, the Anglo-American system of equity jurisprudence is not infallible. There are many traps for the unwary that are easily exploited by unscrupulous persons who (a) are more knowledgeable of such a system and (b) have greater resources. A court has equity jurisdiction as long as one of the parties to a written contract alleges that the written contract does not embody the agreement between the parties due to a mutual mistake. In particular, state court decisions are replete with instances in which Deeds of Trust have been reformed on the ground of mutual mistake so as to include land erroneously omitted.

What is "equity?"

> "The term 'equity' is often misunderstood and, as a consequence, often misapplied by courts when asked to grant an equitable remedy. In a broad jurisprudential sense, **equity means the power to do justice in a particular case by exercising discretion** to mitigate the rigidity of strict legal rules. In this broad sense, equity means the power to adapt the relief to the circumstances of the particular case, 'individualized justice,' in effect. . . The loose use of the terms 'equity' and 'equitable' to mean 'fair,' 'compassionate,' and 'flexible' has resulted in decisions by equity courts whose rationale remains hidden when 'equity' is offered as the reason for the decision. . . A decision that rests solely on 'equity' is an *analytically naked*, and *analytically suspect*, decision. It is a decision that rests on nothing more than the judge's subjective feelings of what is fair under the circumstances." Bold and italics added. Kennedy, 74 **U. Det. Mercy L. Rev**. 609 (Summer 1997).

What is "discretion?"

> "'Discretion' does not include the judge's mere personal discretion. The term 'discretion,' when used in the context of equitable relief, does not mean unfettered unbridled discretion to do what the judge feels is best. What discretion does mean in this context, however, is PRINCIPLED DISCRETION. Principled discretion is the guiding principle for any judge asked to grant equitable relief. Although courts of equity are often regarded as courts of good conscience, they may not grant equitable relief in the absence of either a statute authorizing such relief or a clear precedent establishing a right to the

relief requested. Indeed, when exercising discretion in the grant or denial of equitable relief, discretion refers to the judge's sound judicial discretion, a limited discretion. As explained by Professor Henry McClintock in his treatise on equity, this means that the judge consults precedent to find the principles that are applicable to a particular situation, and then determines, from all the facts of the case, what relief will best give effect to the principles involved."

Accordingly, the three primary objectives of this article are:

(1) To establish the factual background of the case study [*PennyMac v. Johnson and Wijayaningsih*, File No. 1:20-cv-175 (DC EDNC 2020)] concerning the equitable reformation claim of PennyMac Loan Services, LLC (hereinafter "PennyMac") against Johnson (hereinafter "J") and Wijayaningsih (hereinafter "W") with respect to a 2013 Deed of Trust.

(2) To establish the law at issue with regard to an equitable reformation of a Deed of Trust in North Carolina, which is very similar to laws in other states.

(3) To apply the law at issue to the factual background for the purpose of demonstrating that PennyMac's claim for the equitable reformation of a 2013 Deed of Trust against J & W is meritless and brought solely because PennyMac speculated that J & W did not have either the knowledge or the wherewithal to successfully defend against its reformation claim.

This article argues that if these objectives are met, the general public [including (1) the citizens of North Carolina, (2) the North Carolina Commission on Banks, (3) the North Carolina Department of Insurance, and (4) real estate owners, in general] will have a greater understanding of the law with regard to an equitable reformation of a Deed of Trust and be better able to defend against unscrupulous banks and their loan service providers who (a) are more knowledgeable of the law of equitable reformation and (b) have greater resources. In particular, as a result of such increased understanding, and the implications thereto, it is expected that PennyMac will be motivated to change its conduct with respect to its loan servicing business.

In a case study approach that employs an IRAC (Issue, Rule, Application, Conclusion) structure, similar to that of an I.R.S. Revenue Ruling, this article accomplishes its purpose and objectives in a stepwise fashion, as follows.

- In Part I (The Factual Background), the factual background of the case study, concerning the equitable reformation claim of PennyMac against J & W with respect to a 2013 Deed of Trust signed by J & W, is presented.

- In Part II (The Law at Issue), the law at issue with regard to an equitable reformation of a Deed of Trust in North Carolina is presented.

- In Part III (Application), the law at issue, as presented in Part II, is applied to the factual background, as presented in Part I, for the purpose of demonstrating that PennyMac's claim against J & W for the equitable reformation of a 2013 Deed of Trust signed by J & W was meritless and brought solely because PennyMac speculated that J & W did not have either the knowledge or the wherewithal to successfully defend against its reformation claim.

- In Part IV (Conclusion), implications of the legal findings in Part III are discussed with a view toward extending the current research to address other possible violations of state common law and federal statutory law by PennyMac, based upon the factual background as presented in Part I, which again would require PennyMac to rethink the manner in which it conducts its loan servicing business, likely resulting in imminent changes.

I.
THE FACTUAL BACKGROUND SURROUNDING PENNYMAC'S REFORMATION CLAIM WITH RESPECT TO A 2013 DEED OF TRUST

The factual background of the case study, concerning the equitable reformation claim of PennyMac against J & W with respect to a 2013 Deed of Trust signed by J & W, is presented as follows.

1. **J's cash purchase of Lots 16 and 18.** As a consequence of J's cash purchase of Lots 16 and 18, on November 7, 2008, AmTrust Bank f/k/a Ohio Savings Bank, as Grantor, conveyed the property more particularly described below to J, as Grantee, by executing and delivering a Limited Warranty Deed, recorded on November 10, 2008, in Book 2856, Page 708 of the Brunswick County Public Registry, North Carolina:

    Being all of Lots 16 and 18, Block 186, Section N-6, Long Beach (now Oak Island), NC as shown on map recorded in Map Book 11, Page 89, Brunswick County Registry.

    A warranty deed is a legal document, signed by both the buyer and the seller, in a real estate sales transaction and is used to transfer ownership rights in real estate.

2. On or before November 7, 2008, having total control over Lots 16 & 18, for the purpose of insuring the home on Lots 16 & 18, J made the personal and unilateral decision to purchase dwelling and flood insurance from the Farm Bureau, which was maintained until 2018.

3. **J's cash purchase of Lots 13, 15 and 17.** As a result of J's cash purchase of Lots 13, 15 and 17, on or about August 25, 2012, Homer E. Wright, Jr., as Grantor, conveyed the property more particularly described below to J, as Grantee, by executing and delivering a General Warranty Deed, recorded on August 31, 2012, in Book 3307, Page 799 of the Brunswick County Public Registry, North Carolina:

    BEING ALL OF LOTS 13, 15 AND 17, BLOCK 186, SECTION N-6, LONG BEACH (now Oak Island) as per map for National Development Corp. prepared by Howard M. Loughlin, Registered Land Surveyor, recorded in Map Book 11, page 89, office of the Register of Deeds for Brunswick County, North Carolina.

4. Having total control over Lots 13, 15 & 17, for the purpose of avoiding the recurring, annual Sewer District Fee, levied upon owners of undeveloped parcels by the Town of Oak Island, North Carolina, in two Instruments of Combination (for property tax and assessment purposes only), dated October 29, 2012 and June 12, 2013, J made the personal and unilateral decision to combine Lots 13, 15 & 17 with contiguous Lots 16 & 18.

5. On June 9, 2013, J submitted a Uniform Residential Loan Application to Weststar Mortgage, Inc. for the purpose of "refinancing," i.e., debt consolidation. In addition, J made the personal and unilateral decision to elect (a) to continue purchasing from the Farm Bureau dwelling insurance and flood insurance on his home located on Lots 16 & 18 and (b) to have Weststar Mortgage, Inc. set up an escrow account so that he would pay property taxes and insurance on a monthly basis for the purpose of having a more even cash outflow.

6. In the course of the evaluation of J's loan application by the underwriters, **Weststar ordered an appraisal**, whereupon "[t]he purpose of the appraisal [was only] to provide an opinion of the market value of the property described in the body of [the] report" (i.e., Lots 13, 15, 16, 17 & 18).

7. In the course of evaluating J's loan application, Weststar underwriters demanded more information and documents as a requisite to determining provisions of the loan offer and the closing of the loan.

8. On or after July 1, 2013, in a telephone call between Weststar's Loan Originator, Pamela Franz, and J, J asked Weststar's Loan Originator, Pamela Franz, who he should contact if he had questions regarding the eventual terms of the loan offer and the closing documents. Weststar's Loan Originator, Pamela Franz, stated that she would answer J's questions and that J could question any document, except for the legal description of the property in the Deed of Trust, which was referenced in the Note. Weststar's Loan Originator, Pamela Franz, stated emphatically that the legal description of the property described in the Deed of Trust could not be changed under any circumstances.

9. As a result of the careful, thorough, and detailed evaluation and quality reviews of J's loan application, conducted by Weststar's underwriters and Westar's senior loan officers between July 15-17, 2013, permission to close was granted by said persons.

10. Weststar's Loan Originator, Pamela Franz, told J that the loan offer and closing documents would be electronically transmitted to J. Furthermore, Weststar's Loan Originator, Pamela Franz, gave J instructions for accepting such loan offer and signing said closing documents, where an exact timeline for signing said closing documents had to be followed to successfully close the loan.

11. When J received the loan offer and closing documents, a Deed of Trust (hereafter "the 2013 Deed of Trust") was included in those documents. On pages 2-3, paragraph 19, of the 2013 Deed of Trust, it states:

"TRANSFER OF RIGHTS IN THE PROPERTY

The beneficiary in this Security Instrument is MERS (solely as nominee for Lender and Lender's successors and assigns) and the successor and assigns of MERS. **This Security Instrument secures to Lender:** (i) the repayment of the loan, and all renewals, extensions and modifications of the Note; and (ii) **the performance of Borrower's covenants and agreements under this Security Instrument and the Note.** For this purpose, **Borrower irrevocably grants and conveys to Trustee and Trustee's successors and assigns, with power of sale, the following described property located** . . .
SEE LEGAL DESCRIPTION ATTACHED HERETO AND MADE A PART HEREOF AS EXHIBIT 'A'.

Which currently has the address of 111 SouthEast 14th Street, Oak Island, North Carolina 28465

TO HAVE AND TO HOLD this property unto Trustee and Trustee's successors and assigns, forever, together with all of the improvements now or hereafter erected on the property and all easements, appurtenances, and fixtures now or hereafter a part of the property. All replacements and additions shall also be covered by this Security Instrument. All of the foregoing is referred to in this Security Instrument as the "Property." **Borrower understands and agrees that MERS holds only legal title to the interests granted by the Borrower in this Security Instrument**, but, if necessary to comply with law or custom, MERS (as nominee for Lender and Lender's successors and assigns) has the right: to exercise any and all of those interests, including, but not limited to, the right to foreclose and sell the Property; and to take any action required of Lender including, but not limited to, releasing and canceling this Security Instrument." Bold added.

A Deed of Trust is a particular type of general trust, which involves three (3) different parties in a financial arrangement. First, the *trustor* (borrower within the context of a Deed of Trust) is the transferor of property and holds equitable title to said transferred property. Second, the *Trustee* (**an unbiased third party**) is the transferee of property and holds legal title to said transferred property. Third, the *Beneficiary* (lender within the context of a Deed of Trust) is the recipient of security provisions incorporated into the Deed of Trust to ensure that the *trustor/borrower* pays off the loan.

12. In particular, Exhibit "A" of the 2013 Deed of Trust identified in Paragraph 19 describes the Property as:

"The land referred to herein below is situated in the County of Brunswick State of North Carolina described as follows:

Being all of Lots 13, 15 and 17, Block 186, Section N-6, Long Beach (now Oak Island) as per map for National Development Corp prepared by Howard M. Loughlin Registered Land Surveyor,

> **recorded in Map Book 11, Page 89, office of the Register of Deeds for Brunswick County, North Carolina.**
>
> **Parcel ID: 235-IM-036, 2351M037**
>
> **This being the same property conveyed to Brad Johnson from Homer E. Wright, Jr., unmarried in a Deed dated August 2, 2012, recorded August 31, 2012, in Book 3329 Page 0354.**
>
> **Property Commonly Known As: 111 SouthEast 14th Street Oak Island, NC 28465"**

13. When J received the loan offer and closing documents, a Note (hereinafter "the 2013 Note") was included in those closing documents. On page 2 of the 2013 Note, it states:

> "UNIFORM SECURED NOTE
>
> This Note is a uniform instrument with limited variations in some jurisdictions. In addition to the protections given to the Note Holder under this Note, a Mortgage, Deed of Trust, or Security Deed (the "Security Instrument"), dated the same date as the Note, protects the Note Holder from possible losses which might result if I do not keep the promises which I make in this Note."

14. When J received the loan offer and closing documents, J had a number of questions. These questions were E-mailed to Weststar's Loan Originator, Pamela Franz, who promptly responded to J's questions.

15. When J received the loan offer and closing documents, J understood that the 2013 Deed of Trust was a Security Instrument that had as its purpose to secure to Weststar (a) the repayment of the loan, and all renewals, extensions and modifications, of the 2013 Note and (b) the performance of J's covenants, and agreements under the 2013 Deed of Trust and the 2013 Note. Furthermore, J did not question the legal description of the property in the 2013 Deed of Trust, because, Weststar expressly intended that J, as *trustor/borrower*, irrevocably grant and convey to the named Trustee and the named Trustee's successors and assigns, with power of sale, the following property (and no other):

> **"The land referred to herein below is situated in the County of Brunswick State of North Carolina described as follows:**
>
> **Being all of Lots 13, 15 and 17, Block 186, Section N-6, Long Beach (now Oak Island) as per map for National Development Corp prepared by Howard M. Loughlin Registered Land Surveyor, recorded in Map Book 11, Page 89, office of the Register of Deeds for Brunswick County, North Carolina.**

Parcel ID: 235-IM-036, 2351M037

This being the same property conveyed to Brad Johnson from Homer E. Wright, Jr., unmarried in a Deed dated August 2, 2012, recorded August 31, 2012, in Book 3329 Page 0354.

Property Commonly Known As: 111 SouthEast 14th Street Oak Island, NC 28465

which currently has the address of 111 SouthEast 14th Street Oak Island, NC 28465"

16. Moreover, at closing, on July 19, 2013, to serve the purpose of the 2013 Deed of Trust, J, as *trustor/borrower*, expressly intended to accept Weststar's loan offer and irrevocably grant and convey to the named Trustee and the named Trustee's successors and assigns, with power of sale, the following property (and no other):

"The land referred to herein below is situated in the County of Brunswick State of North Carolina described as follows:

Being all of Lots 13, 15 and 17, Block 186, Section N-6, Long Beach (now Oak Island) as per map for National Development Corp prepared by Howard M. Loughlin Registered Land Surveyor, recorded in Map Book 11, Page 89, office of the Register of Deeds for Brunswick County, North Carolina.

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Property Commonly Known As: 111 SouthEast 14th Street Oak Island, NC 28465

which currently has the address of 111 SouthEast 14th Street Oak Island, NC 28465"

17. After J signed the closing documents, those closing documents were sent to Linear Title & Closing. Linear Title & Closing reviewed those closing documents, found no irregularities, proceeded with closing the transaction, and recorded the 2013 Note and 2013 Deed of Trust.

18. Through two letters dated August 8, 2013, and September 2, 2013, PennyMac notified J that the 2013 Note had been sold to PennyMac on August 6, 2013. In PennyMac's Letter dated September 2, 2013, PennyMac states:

> "The purpose of this notice is to inform you that your mortgage loan referenced above was sold to PennyMac Loan Services, LLC ('PennyMac' or 'Creditor') on August 6, 2013. The Creditor also services your loan. Please note, this letter does not require any action to be taken on your part, but is simply a courtesy notification of the assignment, sale, or transfer of your mortgage loan. Below is PennyMac's contact information, should you have any questions or concerns about your loan.
>
> The transfer of mortgage loans is a standard part of the mortgage business for many of the nation's mortgage lenders. **The transfer of your mortgage loan to the Creditor does not affect any terms or conditions of the Mortgage/Deed of Trust or Note. The transfer of ownership of your mortgage loan has not been publicly recorded.**" Bold Added.

Enclosed in the letter dated September 2, 2013 were the 2013 Deed of Trust and the 2013 Note.

19. On September 2, 2013, PennyMac had knowledge that the Property, which is the subject of the 2013 Deed of Trust, is vacant land (the information in Brunswick County (N.C.) Registry of Deeds is public knowledge, available on-line). Correspondingly, on September 2, 2013, PennyMac had knowledge that neither hazard property insurance nor flood insurance on Lots 16 & 18 would insure PennyMac's security interest in the Property identified in the 2013 Deed of Trust (i.e., Lots 13, 15 & 17).

20. On September 20, 2017, J received a marketing E-mail from PennyMac.

21. Shortly after receiving the E-mail referenced above, J called PennyMac for the purpose of having PennyMac discontinue paying for the Farm Bureau insurance policies, as of April (dwelling insurance) and May (flood insurance), 2018, because his daughter was planning to enter college in Fall, 2019 and he wanted to decrease his expenses in preparation. Specifically, J spoke with a PennyMac employee/agent in the Escrow/Insurance Area about discontinuing these insurance policies. This PennyMac employee/agent in the Escrow/Insurance Area responded by saying that such insurance was required. J responded by saying that PennyMac only had a beneficial security interest in the land, so that he did not think that flood and dwelling insurance policies were required. The PennyMac employee/agent responded by saying that he would look into it (i.e., whether such insurance policies were required).

22. In all of the phone conversations with PennyMac, each PennyMac employee/agent in the Escrow/Insurance Area refused to give his/her full name. Accordingly, J simply states that his call was made to a "PennyMac employee/agent in the Escrow/Insurance Area," when J states with whom J spoke and the specific response of said PennyMac employee/agent to J's inquiry.

23. In April 2018, J discovered that PennyMac paid to renew the Farm Bureau dwelling policy over his objections. As a result, J was determined to close his escrow account and discontinue the insurance himself. Accordingly, during the months of April – August 2018, J made several telephone calls to PennyMac employees/agents in the Escrow/Insurance Area concerning his request to close his escrow account. In each of those calls, J stated that the escrow account is

elective in nature and J determined that it was no longer needed. In addition, J told each PennyMac employee/agent in the Escrow/Insurance Area that PennyMac only had a beneficial security interest in the land, so that J did not think that flood and property insurance policies were required.

24. Based upon the conversations referenced above, on May 25, 2018, by Letter (transmitted by the U.S. Mail) dated May 25, 2018, PennyMac denied J's request to close his escrow account. However, on August 31, 2018 and September 17, 2018, by Letters (transmitted by the U.S. Mail) dated August 31, 2018 and September 17, 2018 to J, PennyMac approved his request to close his escrow account, while, at the same time, in contravention of the terms and conditions of the 2013 Deed of Trust and the 2013 Note, PennyMac stated that J must continue paying for property insurance.

25. With regard to one of those telephone calls referenced above, J called a PennyMac employee/agent in the Escrow/Insurance Area on June 4, 2018 and told said employee/agent that PennyMac only had a beneficial security interest in vacant land, so that J did not think that flood and property insurance policies were required. In response, said PennyMac employee/agent in the Escrow/Insurance Area called J on June 14, 2018 regarding a letter to be sent via the U.S. Mail, by PennyMac to J on June 15, 2018. This letter enclosed the 2013 Deed of Trust and the 2013 Note, but the PennyMac employee/agent in the Escrow/Insurance Area intentionally omitted Schedule "A" of the 2013 Deed of Trust in an attempt to conceal the true identity of the Property identified in said Deed of Trust.

26. **Offer**. After September 17, 2018, J had several telephone conversations with PennyMac employees/agents in the Escrow/Insurance Area concerning his plan to not renew the Farm Bureau insurance policies, as of April (dwelling insurance) and May (flood insurance), 2019, because his daughter was planning to enter college in Fall, 2019 and J wanted to decrease his expenses in preparation. Specifically, in each of those telephone calls, J inquired as to what kind of insurance on vacant land would satisfy the performance of his covenants and agreements under the 2013 Deed of Trust and the 2013 Note. PennyMac employees/agents in the Escrow/Insurance Area responded by initially stating that insurance on the home, located on Lots 16 & 18, was required to insure the vacant land on Lots 13, 15 & 17. However, subsequently, in a second call to a female PennyMac employee/agent in the Escrow/Insurance Area, she stated that if J separated Lots 13, 15 & 17 from Lots 16 & 18, property insurance on the home, located on Lots 16 & 18, would not be required to insure PennyMac's beneficial security interest in the vacant land, i.e., Lots 13, 15 & 17. However, said PennyMac employee/agent in the Escrow/Insurance Area stated that flood insurance would still be required, unless FEMA changed the flood zone designation.

27. **Acceptance**. Based upon the above offer made by the female PennyMac employee/agent in the Escrow/Insurance Area, and in reliance thereof, on March 22, 2019, J accepted PennyMac's offer by preparing and recording an Instrument of Separation, which separated Lots 13, 15 & 17 from Lots 16 & 18, for property tax and assessment purposes only. Brunswick County assigned (a) Parcel # 235IM2104 to Lots 13, 15, & 17, with an assessed valuation of $155,250, and (b) Parcel # 235IM21 to Lots 16 & 18, with an assessed valuation of $386,000.

28. **Breach of Contract Accompanied by Fraud; Breach of Contract (Deed of Trust).** In contravention of the terms and conditions of the unilateral contract that J made with PennyMac, as described above, and in contravention of the terms and conditions of the 2013 Deed of Trust and the 2013 Note, PennyMac began sending threatening letters dated May 10, 2019 and June 14, 2019, via the U.S. Mail, demanding that J buy hazard insurance for his home on Lots 16 & 18, or else suffer economic harm. Specifically, each of such letters threatened J with economic harm unless J purchased property hazard insurance for his home on Lots 16 & 18, which J was under no obligation to do, as follows.

> "REGARDING YOUR LOAN
>
> Our records show that your Homeowners (Hazard) Insurance expired, and we do not have evidence that you have obtained new coverage.
>
> WHY YOU RECEIVED THIS NOTICE
>
> **Because Homeowners (Hazard) Insurance is required on your property, we plan to buy insurance for your property. You must pay us for any period during which the insurance we buy is in effect, but you do not have insurance.**
>
> WHAT YOU SHOULD DO
>
> You should immediately provide us with your insurance information. We require you to maintain Hazard insurance on your property at all times. Please provide a copy of your Insurance Policy Declarations Page, Evidence of Insurance, Binder, or other written confirmation from your insurance agent or carrier. This information must be in writing." Bold added.

29. In May 2019, J met twice with Claire, a Farm Bureau Insurance agent. Initially, about May 13, 2019, J met with Claire to explain his dispute with PennyMac. J explained to Claire that he wanted to discontinue paying for the Farm Bureau flood and property insurance policies, as of April (dwelling insurance) and May (flood insurance), 2019, because J's daughter was planning to enter college in Fall, 2019 and he wanted to decrease his expenses in preparation. Furthermore, J explained that PennyMac only had a beneficial security interest in the land, so that J did not think that flood and property insurance policies were required to satisfy the performance of his covenants and agreements under the 2013 Deed of Trust and the 2013 Note. Moreover, J stated that a female PennyMac employee/agent in the Escrow/Insurance Area had told him that if he separated Lots 13, 15 & 17 from Lots 16 & 18, property insurance on the home, located on Lots 16 & 18, would not be required to insure PennyMac's beneficial security interest in the vacant land on Lots 13, 15 & 17, but that that flood insurance would still be required unless FEMA changed the flood zone designation. J then told Claire that in reliance thereof, J had separated Lots 13, 15 & 17 from Lots 16 & 18 in an Instrument of Separation recorded on March 25, 2019. Specifically, J asked Claire what kind of insurance on vacant land would satisfy the performance of his covenants and agreements under the 2013 Deed of Trust and the 2013 Note. Claire stated that she did not know of any insurance that would insure

PennyMac's beneficial security interest in vacant land, i.e., Lots 13, 15 & 17, but that Claire would attempt to contact PennyMac.

30. On May 21. 2019, J again met with Claire, a Farm Bureau Insurance agent. Claire stated that she had spoken with a female PennyMac employee/agent in the Escrow/Insurance Area, but that said PennyMac employee/agent was unyielding in requiring property and flood insurance on the home, located on Lots 16 & 18, to insure the vacant land on Lots 13, 15 & 17. Claire stated that she had told said PennyMac employee/agent that she could not write an insurance policy that would insure PennyMac's beneficial security interest in the vacant land on Lots 13, 15 & 17. After discussion with Claire and to partly satisfy the performance of his covenants and agreements under the 2013 Deed of Trust and the 2013 Note, as interpreted by PennyMac, J purchased a Personal Injury Coverage (PIC) policy and renewed his flood insurance on the home, located on Lots 16 & 18, to insure PennyMac's beneficial security interest in the vacant land on Lots 13, 15 & 17.

31. **Breach of Contract Accompanied by Fraud; Breach of Contract (Deed of Trust).** In contravention of the terms and conditions of the unilateral contract that J made with PennyMac, as described above, and in contravention of the terms and conditions of the 2013 Deed of Trust and the 2013 Note, on July 16, 2019, PennyMac sent J, via the U.S. Mail, a Certificate of Coverage Placement with respect to a Lender-Placed Hazard Insurance Policy, between PennyMac and SG Insurance, for the forced hazard insurance coverage for the improvements on Lots 16 & 18. Such Certificate states as follows.

> "Re: Policy Number: MLR07769715085
>
> Hazard Insurance Annual Premium amount under PENNYMAC LOAN SERVICES, LLC's Policy**: $2,880.00**
>
> Hazard Insurance Coverage Amount under PENNYMAC LOAN SERVICES, LLC's Policy: **$369,500**
> (This insurance may provide less coverage than was in effect previously.)
> In case of loss, report it by calling 1-800-652-1262.
> **REGARDING YOUR LOAN**
>
> Our records indicate we have not been provided proof of acceptable homeowner's insurance on the above-referenced property in response to our prior notifications to you. **As you know, your loan agreement requires that you provide us with proof of acceptable and continuous homeowner's insurance on an annual basis.** As we have not received proof of acceptable homeowner's insurance coverage, which was requested in our prior notifications to you, **we have purchased a Lender-Placed Insurance to protect our interest in the dwelling structure, by advancing funds from your escrow account.**
>
> **The Lender-Placed Insurance purchased includes coverage in the amount of $369,500 with an annual premium of $2,880.00.**

WHAT THIS MEANS

Enclosed you will find a copy of the Certificate of Insurance that has been purchased by PENNYMAC LOAN SERVICES, LLC**. For insurance coverage that we obtain for your Property (Lender-Placed Insurance), you will be responsible for reimbursing PENNYMAC LOAN SERVICES, LLC for the premium associated with such coverage.** The annual premium for this insurance will be paid from your escrow account. **If you did not have an escrow account, PENNYMAC LOAN SERVICES, LLC has established one for you and will provide you with an escrow analysis statement, which will explain the increase in your monthly payment to recover the amount advanced as well as future insurance payments.**

Please allow us to recap the important facts about Lender-Placed Insurance:

- This insurance may be more expensive and will likely provide less coverage than was previously in effect.
- **This insurance protects the dwelling structure at your expense.**
- **The Lender-Placed Insurance premium has been advanced from your escrow account. If you did not have an escrow account, PENNYMAC LOAN SERVICES, LLC has established one for you and will provide you with an escrow analysis statement, which will explain the increase in your monthly payment to recover the amount advanced as well as future insurance payments. You will be responsible for any applicable taxes or fees, which result from the purchase of this insurance**." Bold added.

32. **Breach of Contract Accompanied by Fraud; Breach of Contract (Deed of Trust).** Also, in contravention of the terms and conditions of the unilateral contract that J made with PennyMac, as described above, and in contravention of the terms and conditions of the 2013 Deed of Trust and the 2013 Note, on July 16, 2019, beginning with PennyMac's Mortgage Activity Statement, dated July 16, 2019, and with PennyMac's Escrow Account Disclosure Statement, dated August 12, 2019, and continuing with PennyMac's Mortgage Activity Statements dated August 19, 2019 and September 17, 2019, where each of said statements was sent by PennyMac to J via the U.S. Mail, PennyMac (a) charged J $2880 for the Lender-Placed Hazard Insurance Policy between PennyMac and SG Insurance, referenced above, to force hazard insurance coverage on J's home on Lots 16 & 18, and (b) increased J's monthly payment from $1506.82 to $2106.81.

33. On or about August 20, 2019, J separately complained to (a) the North Carolina Commissioner of Banks and (b) the North Carolina Department of Insurance regarding the unlawful activities described above of (1) PennyMac (in contravention of the terms and conditions of the unilateral contract that J made with PennyMac, as described above, and in contravention of the terms and conditions of the 2013 Deed of Trust and the 2013 Note) and (2) SG Insurance, respectively. In his Complaint, J declared as follows.

"PennyMac has contracted with Standard Guaranty Insurance Company (Standard) for Standard to write a Residential Dwelling Certificate, i.e., a 'lender-placed policy' (Policy Number MLR07769715085). However, **PennyMac has no insurable interest in the real property (dwelling) that is the object of the Residential Dwelling Certificate**. To make matters worse, PennyMac has increased the principal balance of the debt that [J] owe[s] by over $2800 – the cost of the lender-placed policy.

The lender-placed policy speaks of 'material misrepresentation' [paragraph 16(b)(2)]. However, [J has] tried twice to contact Standard to tell Standard about the material misrepresentation made by PennyMac. Standard will not talk to [J] about the issue. **Standard says that [J has] to talk to PennyMac**." Bold added.

34. On September 5, 2019, Mr. Saldivar, an employee/agent of PennyMac, responded to J by Letter, transmitted via the U.S. Mail, regarding the Complaint that J filed with the North Carolina Commission of Banks, which is referenced above. Mr. Saldivar stated that J was "paid through August 2019" (i.e., was not in default) and, as proof, Mr. Saldivar included (a) a "Customer Account Activity Statement" and (b) the 2013 Note.

35. **Breach of Contract Accompanied by Fraud; Breach of Contract (Deed of Trust).** In contravention of the terms and conditions of the unilateral contract that J made with PennyMac, as described above, and in contravention of the terms and conditions of the 2013 Deed of Trust and the 2013 Note, on September 19, 2019, Mr. Saldivar, an employee/agent of PennyMac, responded to the North Carolina Commission of Banks by Letter, transmitted via the U.S. Mail, regarding the Complaint that J filed with the North Carolina Commission of Banks, which is referenced above. Mr. Saldivar stated that "a title claim has been filed" with Linear Title & Closing (*which was subsequently denied*) and that PennyMac "reserves the right to seek reimbursement from [J]."

36. On August 30, 2019, and September 26, 2019, Mrs. Sanchez, an employee/agent of SG Insurance and Assurant, responded to the North Carolina Department of Insurance by Letter, transmitted via the U.S. Mail, regarding the Complaint that J filed with the North Carolina Department of Insurance, which is referenced above. In her letter dated September 26, 2019, Mrs. Sanchez states as follows.

"**[Assurant and SG Insurance] have worked closely with PennyMac,** who is the lender and named insured on our policy **to reach a conclusion for [J]**. [Assurant and SG Insurance] understand that **PennyMac is fully aware of [J's] complaint** and **working to resolve the issue** with respect to the title, legal descriptions, and status of any improvements on the mortgaged property in question.

The lender-placed Fire/Allied certificate (numbered MLR07769715085) that was issued on [J's] property, 111 Se 14th Street, Oak Island, NC 28465, with an inception date of May 9, 2019, **remains in effect at this time, at the direction of PennyMac,** until their research is completed and a definitive resolution to [J's] concerns is finalized. Should PennyMac's research indicate that the insurance with Standard Guaranty was not

> necessary it will be adjusted accordingly. **Until such resolution is concluded, the insurance will remain in effect. . .**
>
> **We continue to strongly believe that PennyMac is the sole party who can conclusively address any issues pertaining to the servicing of [J's] mortgage loan. A final resolution to these matters will be best reached by [J] continuing to work directly with PennyMac.** He may contact Mr. Efren Saldivar with PennyMac at 866-695-4122 ext. 2319 for further assistance." Bold added.

37. On October 2, 2019, the Office of the North Carolina Commissioner of Banks responded to the Complaint filed by J, which is referenced above, by Letter dated October 2, 2019, from the North Carolina Commissioner of Banks to J. Said Letter to J stated as follows.

> "**If you are not satisfied** with [PennyMac's] reply, please contact the company directly. Also, should you wish to pursue this matter further, **you may want to consider consulting with a private attorney or legal services provider to determine if you have private legal rights or remedie**s." Bold added.

38. From October 2, 2019 through February 13, 2020, J placed a multitude of telephone calls to both (a) Mr. Saldivar of PennyMac at 866-695-4122 ext. 2319 and (b) Mrs. Sanchez of Assurant and SG Insurance at 714-338-7720. In each of those calls, J failed to reach the person called directly, so J left a message. Several of the messages to both (a) Mr. Saldivar of PennyMac and (b) Mrs. Sanchez of Assurant and SG Insurance reiterated that PennyMac only has a beneficial security interest in the land, so that flood and property insurance policies are not required to satisfy the performance of J's covenants and agreements under the 2013 Deed of Trust and the 2013 Note. Furthermore, J further stated that PennyMac was purposefully and intentionally misrepresenting the facts to SG Insurance and Assurant, thereby making the forced, lender-placed insurance policy invalid, under its terms. In all of his messages, J requested a return telephone call. Neither Mr. Saldivar nor Mrs. Sanchez returned any of J's telephone calls. Instead, on October 17, 2019, PennyMac obtained a fraudulent Assignment of Deed of Trust from the Mortgage Electronic Registration Systems, Inc. (MERS), who was the *Trustee* of the 2013 Deed of Trust, whereupon, on November 4, 2019, PennyMac recorded such Assignment in the North Carolina Register of Deeds, Brunswick County. Such Assignment of Deed of Trust falsely identifies the Property Address as "111 SOUTHEAST 14TH STREET, OAK ISLAND, NORTH CAROLINA 28465," whereas the current address of the Property Address is on SE 13th Street in Oak Island, NC 28465, which is well-known to PennyMac. As a result, PennyMac is currently the *Trustee* of the 2013 Deed of Trust, a fiduciary that is legally obligated to be unbiased.

39. Furthermore, on January 23, 2020, PennyMac sued J & W in the State of North Carolina, Forsyth County District Court, rather than the Brunswick County District Court, speculating that the Defendants would lack the capacity to defend against the false allegations of PennyMac in its Complaint. Clearly, the State of North Carolina, Forsyth County District Court, lacks venue, since there is not one allegation of fact by any party that implicates Forsyth County. Contemporaneous, PennyMac filed a Notice of Les Pendens Lien in Brunswick County, North Carolina. Notwithstanding the foregoing, J a citizen and resident of South Carolina. PennyMac attempted to serve both J & W by sending one copy of the Complaint and one Civil Summons

naming “J” by certified mail to W. Such service of process against both J & W is insufficient and ineffective.

40. **Breach of Contract Accompanied by Fraud; Breach of Contract (Deed of Trust).** The conduct of PennyMac, Assurant and SG Insurance referenced above continued after PennyMac’s Complaint against J & W was filed on January 23, 2020. Specifically, in contravention of the terms and conditions of the unilateral contract that J made with PennyMac, as described above, and in contravention of the terms and conditions of the 2013 Deed of Trust and the 2013 Note, Assurant, on behalf of PennyMac, sent another threatening letter dated March 2, 2020, via the U.S. Mail, demanding that J buy property hazard insurance on his home on Lots 16 & 18, or else, suffer economic harm. More specifically, such letter threatened J with economic harm, as follows, unless J purchased property hazard insurance on his home on Lots 16 & 18, which J was under no obligation to do.

> “Your insurance certificate is due to renew on 05/09/2020. If the Named Insured Mortgagee renews the lender-placed insurance certificate on your property, it may be renewed with a change in premium. It may also have a change in deductible(s).
>
> **This insurance certificate was purchased on your behalf because you did not maintain insurance coverage on your property as required by the terms of your loan.** If you purchase other insurance coverage on your property prior to the renewal date, please mail a copy of the policy to the above Named Insured Mortgagee [Pennymac].” Bold added.

Here, Assurant and SG Insurance continue to perpetrate a fraud on behalf of PennyMac.

41. **Breach of Contract Accompanied by Fraud; Breach of Contract (Deed of Trust).** The conduct of PennyMac, Assurant and SG Insurance referenced above continued after PennyMac’s Complaint against J & W was filed on January 23, 2020. Specifically, in contravention of the terms and conditions of the unilateral contract that J made with PennyMac, as described above, and in contravention of the terms and conditions of the 2013 Deed of Trust and the 2013 Note, PennyMac sent another threatening letter dated March 20, 2020, via the U.S. Mail, demanding that J buy property hazard insurance on his home on Lots 16 & 18, or else, suffer economic harm. More specifically, such letter threatened J with economic harm unless J purchased property hazard insurance on his home on Lots 16 & 18, which J was under no obligation to do, as follows.

> “REGARDING YOUR LOAN
>
> Because we did not have evidence that you had Homeowners (Hazard) Insurance on the property listed above, **we bought insurance on your property and added the cost to your mortgage loan account.**
>
> WHY YOU RECEIVED THIS NOTICE

> . . . **Because Homeowners (Hazard) Insurance is required on your property, we intend to maintain insurance on your property by renewing or replacing the insurance we bought**. . .
>
> WHAT YOU SHOULD DO
>
> We require you to maintain Hazard insurance on your property at all times. Please provide a copy of your Insurance Policy Declarations Page, Evidence of Insurance, Binder, or other written confirmation from your insurance agent or carrier. This information must be in writing." Bold added.

42. **Breach of Contract Accompanied by Fraud; Breach of Contract (Deed of Trust).** In contravention of the terms and conditions of the 2013 Deed of Trust and the 2013 Note, in PennyMac's Mortgage Activity Statements, dated May 16, 2020, June 16, 2020, and July 16, 2020, where each of said statements was sent by PennyMac to [J] via the U.S. Mail, PennyMac (a) charged [J] $3137 to renew the Forced, Lender-Placed Hazard Insurance Certificate between PennyMac and SG Insurance, referenced above, to force hazard insurance coverage on his home on Lots 16 & 18, and (b) reestablished, and then charged, an escrow account for [J] in the amount of $3137.

43. **Breach of Contract Accompanied by Fraud; Breach of Contract (Deed of Trust).** In contravention of the terms and conditions of the 2013 Deed of Trust and the 2013 Note, by using the U.S. wires, PennyMac withdrew $2138.56 (rather than $1506.82) from [Dr. Johnson's] bank account.

44. **Breach of Contract Accompanied by Fraud; Breach of Contract (Deed of Trust).** In contravention of the terms and conditions of the 2013 Deed of Trust and the 2013 Note, in PennyMac's Mortgage Activity Statement dated September16, 2020, where said statement was sent by PennyMac to [J] via the U.S. Mail, PennyMac increased [his] monthly payment from $1506.82 to $2138.56, representing an increase of $631.74 to reimburse PennyMac for its forced, lender-placed hazard insurance coverage on J's home on Lots 16 & 18.

II.
THE LAW AT ISSUE WITH REGARD TO AN EQUITABLE REFORMATION OF A DEED OF TRUST IN NORTH CAROLINA

A.
A REFORMATION CLAIM - THE LAW OF REFORMATION

> "A deed purporting to convey an interest in land is void unless it contains a description of the land sufficient to identify it or refers to something extrinsic by which the land may be identified with certainty. *State v. Brooks*, 279 N.C. 45, 181 S.E. 2d 553; *Carlton v. Anderson*, 276 N.C. 564, 173 S.E. 2d 783; *Lane v. Coe*, 262 N.C. 8, 136 S.E. 2d 269; *Deans v. Deans*, 241 N.C. 1, 84 S.E. 2d 321; *Searcy v. Logan*, 226 N.C. 562, 39 S.E. 2d 593; Strong, N. C. Index 2d, Boundaries, § 10. When the deed itself, including the references to extrinsic things, describes with certainty the property intended to be

> conveyed, parol evidence is admissible to fit the description in the deed to the land. G.S. 8-39; *State v. Brooks, supra*. **Parol evidence is not admissible, however, to enlarge the scope of the description in the deed.** *State v. Brooks, supra; Self Help Corp. v. Brinkley*, 215 N.C. 615, 2 S.E. 2d 889." Bold added. *Overton v. Boyce*, 289 N.C. 291, 293, 221 S.E.2d 347, 349 (1976).

Furthermore, **no reformation is needed where the four corners of the Deed of Trust refers to things that, extrinsically, completely and adequately describe and identify the Property.** *See Poore v. Swan Quarter Farms, Inc.*, 79 N.C. App. 286, 289-90, 338 S.E.2d 817, 819 (1986).

Under North Carolina law, "[r]eformation is a well-established equitable remedy used to reframe written instruments where, through mutual mistake or unilateral mistake of one party induced by the fraud of the other, **the written instrument fails to embody the parties' actual, original agreement.**" Bold added. *Warren v. Russell*, (*In re Skumpija*), 494 B.R. 822, 831 (Bankr. E.D.N.C. 2013). Generally, reformation permits a court to "rewrite a deed to make it conform to the intention of the parties." However, the party seeking reformation must demonstrate "that the terms of the instrument do not represent the original understanding of the parties . . . by clear, cogent and convincing evidence." *Id*. **In other words, the party seeking reformation has the burden of showing that a material agreement between the parties is incorrectly incorporated in the instrument and that the agreement of the parties was not included in the instrument by mistake.** *Light v. Equitable Life Assurance Soc'y,* 56 N.C. App. 26, 33, 286 S.E.2d 868 (1982).

A mutual mistake is one that is shared by both parties to the contract, "wherein each labors under the same misconception respecting a material fact, the terms of the agreement, or the provisions of the written instrument designed to embody such agreement." *Metropolitan Prop. & Cas. Ins. Co. v. Dillard*, 126 N.C. App. 795, 798, 487 S.E.2d 157, 159 (1997). **A party seeking reformation on the ground of mutual mistake must prove that (1) the parties agreed upon a material stipulation to be included in the written instrument, (2) that the stipulation was omitted by the parties' mistake, and (3) that because of the mistake, the written instrument does not express the parties' intention.** *See Branch Banking & Trust Co. v. Chicago Title Ins. Co*., 214 N.C. App. 459, 464, 714 S.E.2d 514, 518 (2011). The party seeking reformation must prove the existence of the mutual mistake by "**clear, cogent and convincing evidence**." Bold added. *Hice v. Hi-Mil, Inc*., 301 N.C. 647, 651, 273 S.E.2d 268, 270 (1981); *see also Durham v. Creech*, 32 N.C. App. 55, 59, 231 S.E.2d 163, 166 (1977).

In *Branch Banking & Trust Co. v. Chicago Title Ins. Co*., 214 N.C. App. 459, 714 S.E.2d 514 (2011), the N,C. Court of Appeals held as follows.

> "'When a party seeks to reform a contract due to an affirmative defense such as mutual mistake . . . the burden of proof lies with the moving party.' *Smith v. First Choice Servs.,* 158 N.C. App. 244, 250, 580 S.E.2d 743, 748 (2003) (citation omitted).
>
> > **'[T]here is 'a *strong presumption* in favor of the correctness of the instrument as written and executed, for it must be assumed that the parties knew what they agreed and have chosen fit and proper words to express that agreement**

> **in its entirety.' This presumption is strictly applied when the terms of a deed are involved in order 'to maintain the stability of titles and the security of investments.'** . . .
>
> '''The party asking for relief by reformation of a deed or written instrument, must allege and prove, **first, that a material stipulation, as alleged, was agreed upon by the parties, to be incorporated in the deed or instrument as written,** and **second, that such stipulation was omitted from the deed or instrument as written, by mistake, either of both parties,** or of one party, induced by the fraud of the other, or by the mistake of the draughtsman. Equity will give relief by reformation only when a mistake has been made, and the deed or written instrument because of the mistake does not express the true intent of both parties. **The mistake of one party to the deed, or instrument, alone, not induced by the fraud of the other, affords no ground for relief by reformation**.''
>
> When the pleader has alleged (**1) the terms of an oral agreement made between the parties; (2) their subsequent adoption of a written instrument intended by both to incorporate the terms of the oral agreement but differing materially from it; and (3) their mutual but mistaken belief that the writing contained their true, *i.e.,* the oral, agreement,** our cases hold that the pleading will survive a demurrer.' *Matthews v. Van Lines,* 264 N.C. 722, 725, 142 S.E.2d 665, 668 (1965) (citations omitted)." Bold added.

Branch Banking & Trust Co. v. Chicago Title Ins. Co., 214 N.C. App. 459, 464, 714 S.E.2d 514, 518 (2011).

More recently, in *Nationstar Mortg., LLC v. Dean*, 261 N.C. App. 375, 820 S.E.2d 854 (2018), the N.C. Court of Appeals held as follows.

"'***Reformation*** is a well-established equitable remedy used to reframe written instruments where, **through mutual mistake** or the unilateral mistake of one party induced by the fraud of the other, the written instrument fails to embody the parties' actual, original agreement.' *Metropolitan Property And Cas. Ins. Co. v. Dillard, 126 N.C. App. 795, 798, 487 S.E.2d 157, 159 (1997)* (citation omitted).

The trial court has the authority to *reform* a *deed of trust*. Deeds of trust are written instruments that are subject to *reformation* claims. *Noel Williams Masonry v. Vision Contractors of Charlotte, 103 N.C. App. 597, 603, 406 S.E.2d 605, 608 (1991)*. 'In an action for *reformation* of a written instrument, **the plaintiff has the burden of showing that the terms of the instrument do not represent the original understanding of the parties** . . . .' *Hice v. Hi-Mil, Inc., 301 N.C. 647, 651, 273 S.E.2d 268, 270 [*382] (1981)* (citations omitted). '**If the evidence is strong, cogent, and convincing that the deed, as recorded, did not reflect the agreement between the parties due to a mutual mistake** caused by a drafting error, a deed can be *reformed*.' *Drake v. Hance, 195 N.C. App. 588,* *592, 673 S.E.2d 411, 414 (2009)* (citing *Parker v. Pittman, 18 N.C. App. 500, 505, 197 S.E.2d 570, 573 (1973))*.

'**There is a strong presumption in favor of the correctness of the instrument as written and executed, for it must be assumed that the parties knew what they agreed and have chosen fit and proper words to express that agreement in its entirety.**' *Hice, 301 N.C. at 651, 273 S.E.2d at 270* (internal quotation marks, citation, and emphasis omitted). '[E]quity for the *reformation* of a deed or written instrument extends to the inadvertence or mistake of the draftsman who writes the deed or instrument.' *Crews v. Crews, 210 N.C. 217, 221, 186 S.E. 156, 158 (1936)* (citation and internal quotation marks omitted)." Bold added.

Nationstar Mortg., LLC v. Dean, 261 N.C. App. 375, 381, 820 S.E.2d 854, 859 (2018).

B.
A REFORMATION CLAIM –
THE LAW OF AFFIRMATIVE DEFENSES: "LACHES"

Laches is an affirmative defense which must be pleaded, and the burden of proof is on the party asserting the defense. *Taylor v. City of Raleigh*, 290 N.C. 608, 622, 227 S.E.2d 576, 584 (1976). To succeed on the defense of laches, the defendant must show that t**he delay "resulted in some change** in the condition of the property or the **relation of the parties.**" Bold added. *MMR Holdings, LLC v. City of Charlotte*, 148 N.C. App. 208, 209, 558 S.E.2d 197, 198 (2001). "[T]he mere passage or lapse of time is insufficient to support a finding of laches; **for the doctrine of laches to be sustained, the delay must be shown to be unreasonable and must have worked to the disadvantage, injury or prejudice of the person seeking to invoke it**." Bold added. *Taylor*, 290 N.C. at 622-23, 227 S.E.2d at 584-85.

"The doctrine of laches is designed to promote justice by preventing surprises through the revival of claims that have been allowed to slumber until evidence has been lost, memories have faded, and witnesses have disappeared." *Stratton v. Royal Bank of Canada*, 211 N.C. App. 78, 88-89, 712 S.E.2d 221, 230 (2011).

In *Stratton v. Royal Bank of Canada*, 211 N.C. App. 78, 712 S.E.2d 221 (2011), the N.C. Court of Appeals held as follows.

"To establish the affirmative defense of laches, our case law recognizes that 1) the doctrine applies where a **delay of time has resulted in some change** in the condition of the property or **in the relations of the parties**; 2) the delay necessary to constitute laches depends upon the facts and circumstances of each case; however, the mere passage of time is insufficient to support a finding of laches; 3) **the delay must be shown to be unreasonable** and must have **worked to the disadvantage, injury or prejudice of the person seeking to invoke the doctrine of laches**; and 4) the defense of laches will only work as a bar when the **claimant knew of the existence of the grounds for the claim**. *Farley v. Holler, 185 N.C. App. 130, 132-33, 647 S.E.2d 675, 678 (2007)* (quoting *MMR Holdings, LLC v. City of Charlotte, 148 N.C. App. 208, 209-10, 558 S.E.2d 197, 198*

> *(2001))*." Bold added. *Stratton v. Royal Bank of Canada*, 211 N.C. App. 78, 88-89, 712 S.E.2d 221, 230 (2011).

Within this context:

> "a party may be charged with constructive knowledge of the grounds for her claim when it is clear that **a party had ample notice of those grounds.** *See Save Our Sch. of Bladen Cnty., Inc. v. Bladen Cnty. Bd. of Educ., 140 N.C. App. 233, 236-37, 535 S.E.2d 906, 909 (2000)* (charging plaintiff with knowledge of the grounds for its claim)." Bold added. *Stratton* at 712 S.E.2d 231.

Furthermore:

> "Failure to exercise due diligence in discovering a mistake has been determined as a matter of law where it was clear that there was both capacity and opportunity to discover the mistake. *Moore v. Casualty Co., 207 N.C. 433, 177 S.E. 406 (1934)*." *Huss v. Huss*, 31 N.C. App. 463, 468, 230 S.E.2d 159, 162 (1976).

In *Huss v. Huss*, 31 N.C. App. 463, 230 S.E.2d 159 (1976), the N.C. Court of Appeals held as follows.

> "The doctrine of laches is more flexible than the statute of limitations and may bar an equitable remedy by reason of **inexcusable neglect or prejudicial delay** for a period shorter than that in the statute. *Teachey v. Gurley, 214 N.C. 288, 199 S.E. 83 (1938)*. Delay which will constitute laches depends upon the facts and circumstances of each case." Bold added. *Huss v. Huss*, 31 N.C. App. 463, 469, 230 S.E.2d 159, 163.

In *Teachey v. Gurley, 214 N.C. 288, 199 S.E. 83 (1938)*, the N.C. Supreme Court held as follows.

> "In equity, where lapse of time has resulted in some **change** in the condition of the property or in **the relations of the parties** which would make it **unjust to permit the prosecution of the claim**, the doctrine of laches will be applied. Hence, what delay will constitute laches depends upon the facts and circumstances of each case. **Whenever the delay is mere neglect to seek a known remedy or to assert a known right, which the defendant has denied, and is without reasonable excuse, the courts are strongly inclined to treat it as fatal to the plaintiff's remedy in equity, even though much less than the statutory period of limitations, if an injury would otherwise be done to the defendant by reason of the plaintiff's delay."** Bold added. *Teachey v. Gurley, 214 N.C. 288, 294, 199 S.E. 83, 88 (1938)*.

C.
A REFORMATION CLAIM –
THE LAW OF AFFIRMATIVE DEFENSES: "UNCLEAN HANDS"

> "The doctrine of ***unclean hands*** is based upon the premise, 'he who comes into equity must come with clean hands.' *S.T. Wooten Corp. v. Front St. Constr. LLC, 217 N.C. App. 358, 362, 719 S.E.2d 249, 252 (2011)*."
>
> *Nationstar Mortg., LLC v. Dean*, 261 N.C. App. 375, 381, 820 S.E.2d 854, 859 (2018).

In *S.T. Wooten Corp. v. Front St. Constr. LLC,* 217 N.C. App. 358, 719 S.E.2d 249 (2011), the N.C. Court of Appeals held as follows.

> ***"Reformation*** is an equitable remedy, and in order to enjoy this remedy, 'he who comes into equity must come with clean hands.' This 'maxim applies to the conduct of a party with regard to the specific matter before the court [for] which the party seeks equitable relief and does not extend to that party's general character.' *Creech v. Melnik, 347 N.C. 520, 529, 495 S.E.2d 907, 913 (1998)*. The inequitable action need not rise to the level of fraud, though it can, *Stelling v. Wachovia Bank and Trust Co., 213 N.C. 324, 327, 197 S.E. 754, 756 (1938)*; rather **'[t]he clean hands doctrine denies equitable relief only to litigants who have acted in bad faith, or whose conduct has been dishonest, deceitful, fraudulent, unfair, or overreaching in regard to the transaction in controversy.'** *Collins v. Davis, 68 N.C. App. 588, 592, 315 S.E.2d 759, 762 (1984)*, *aff'd*, *312 N.C. 324, 321 S.E.2d 892 (1984)*." Bold added. *S.T. Wooten Corp. v. Front St. Constr. LLC,* 217 N.C. App. 358, 362, 719 S.E.2d 249, 252 (2011).

III.
THE LAW AT ISSUE, PRESENTED IN PART II, IS APPLIED TO THE FACTUAL BACKGROUND, PRESENTED IN PART I

A.
A REFORMATION CLAIM - THE LAW OF REFORMATION
AS APPLIED TO THE FACTUAL BACKGROUND

In equity, based upon mutual mistake, PennyMac claims that an honorable Court should reform a 2013 Deed of Trust, signed by J, as testator/borrower, and Weststar, as beneficiary/lender, which secures a 2013 Note, issued by J to Weststar. The "Property" identified in the 2013 Deed of Trust, which secures the 2013 Note, is described as follows.

> **"The land referred to herein below is situated in the County of Brunswick State of North Carolina described as follows:**
>
> **Being all of Lots 13, 15 and 17, Block 186, Section N-6, Long Beach (now Oak Island) as per map for National Development Corp prepared by Howard M. Loughlin Registered Land Surveyor,**

recorded in Map Book 11, Page 89, office of the Register of Deeds for Brunswick County, North Carolina.

Parcel ID: 235-IM-036, 2351M037

This being the same property conveyed to Brad Johnson from Homer E. Wright, Jr., unmarried in a Deed dated August 2, 2012, recorded August 31, 2012, in Book 3329 Page 0354.

Property Commonly Known As: 111 SouthEast 14th Street Oak Island, NC 28465" Hereinafter, "Lots 13, 15 & 17."

Specifically, in equity, based upon mutual mistake, PennyMac prays that an honorable Court reform the 2013 Deed of Trust, by adding:

"Being all of Lots 16 and 18, Block 186, Section N-6, Long Beach (now Oak Island), NC as shown on map recorded in Map Book 11, Page 89, Brunswick County Registry." **[**Hereinafter "Lots 16 & 18."]

to the "Property" identified in the 2013 Deed of Trust, which secures the 2013 Note.

Lots 13, 15 & 17 and Lots 16 & 18 are owned, individually, by J; although W signed the 2013 Deed of Trust, W has never had a security interest, insurable interest or real property interest in either Lots 13, 15 & 17 or Lots 16 & 18. Specifically, W signed the 2013 Deed of Trust because W was instructed to sign said Deed of Trust by both Weststar and J.

1. PennyMac has Failed to Meet the Requirements of its Reformation Claim under *Branch Banking & Trust Co.*

PennyMac has failed to meet the requirements of its reformation claim. *Branch Banking & Trust Co. v. Chicago Title Ins. Co*., 214 N.C. App. 459, 464, 714 S.E.2d 514, 518 (2011).

a. PennyMac's Reformation Claim Fails to Establish – the Terms of an Oral Agreement Made Between J and Weststar – by Clear, Cogent and Convincing Evidence

First, PennyMac's reformation claim fails to establish, by clear, cogent and convincing evidence, the terms of an oral agreement made between J and Weststar. *Branch Banking & Trust Co. v. Chicago Title Ins. Co., supra.*

b.
PennyMac's Reformation Claim Fails to Establish –
That the Oral Agreement Made Between J and Weststar was
Intended by both J and Weststar to be Adopted in the 2013 Deed of Trust,
Which, in Fact, Differed Materially from Such Oral Agreement –
by Clear, Cogent and Convincing Evidence

Second, PennyMac's reformation claim fails to establish, by clear, cogent and convincing evidence, that the oral agreement made between J and Weststar, referred to above, was intended by both J and Weststar to be adopted in the 2013 Deed of Trust, which, in fact, differed materially from such oral agreement. *Branch Banking & Trust Co. v. Chicago Title Ins. Co., supra.*

c.
PennyMac's Reformation Claim Fails to Establish –
the Mutual, but Mistaken, Belief of J and Weststar that
The 2013 Deed of Trust Contained their Oral (i.e., the True) Agreement –
by Clear, Cogent and Convincing Evidence

Third, PennyMac's reformation claim fails to establish, by clear, cogent and convincing evidence, the mutual, but mistaken belief of both J and Weststar that the 2013 Deed of Trust contained their oral (i.e., the true) agreement. *Branch Banking & Trust Co. v. Chicago Title Ins. Co., supra.*

2.
PennyMac's Reformation Claim is not Proper
Because the 2013 Deed of Trust Accurately Described the "Property"
Weststar and J Intended to Secure the 2013 Note

PennyMac's reformation claim is not proper because the 2013 Deed of Trust accurately described the "Property" Weststar and J intended to secure the 2013 Note. *Poore v. Swan Quarter Farms, Inc.*, 79 N.C. App. 286, 289-90, 338 S.E.2d 817, 819 (1986) (no reformation is needed where the four corners of the Deed of Trust refer to things that, extrinsically, completely and adequately describe and identify the Property); *Branch Banking & Trust Co. v. Chicago Title Ins. Co*., 214 N.C. App. 459, 464, 714 S.E.2d 514, 518 (2011) ("[T]here is 'a *strong presumption* in favor of the correctness of the instrument as written and executed, for **it must be assumed that the parties knew what they agreed and have chosen fit and proper words to express that agreement in its entirety' [;] [t]his presumption is strictly applied when the terms of a deed are involved in order 'to maintain the stability of titles and the security of investments'"**). In the instant case, the "Property" is "extrinsically, completely and adequately described" with parole evidence, pursuant to N.C. Gen. Stat. § 8-39 (2007) and *Overton*, *supra*. *Poore, supra.* Here, the description, as set forth in the 2013 Deed of Trust, contains (1) the "Property's" lot numbers within a particular Block and Section as well as (2) the Map Book and Page numbers and (3) the person from whom the "Property" was conveyed. This description describes the "Property" with certainty as it could only refer to the

"Property." For example, there are no other Lots 13, 15 & 17 in Block 186, Section N-6 of Long Beach (now Oak Island). And, in addition to the legal description as set forth above, the 2013 Deed of Trust also identifies real estate securing the loan by its correct street address and tax parcel number. Here, "there is 'a *strong presumption* in favor of the correctness of the [2013 Deed of Trust] as written and executed." *Branch Banking & Trust Co., supra.*

3.
PennyMac's Reformation Claim is not Proper, Because
Parol Evidence is not Admissible to Enlarge the Scope of the Description of
The "Property" in the 2013 Deed of Trust to Secure the 2013 Note under
***State v. Brooks, supra; Self Help Corp. v. Brinkley*, *supra*. and *Overton v. Boyce*, *supra*.**

PennyMac's reformation claim is not proper, because Parol evidence is not admissible to enlarge the scope of the description of the "Property" in the 2013 Deed of Trust to secure the 2013 Note under *State v. Brooks, supra; Self Help Corp. v. Brinkley*, *supra.* and *Overton v. Boyce*, *supra*. As stated above, the 2013 Deed of Trust accurately described the "Property" Weststar and J intended to secure the 2013 Note. Furthermore, in the instant case, there was no language in the 2013 Deed of Trust indicating any intention that Lots 16 & 18 were being conveyed. Finally, and most importantly, PennyMac did not forecast any evidence tending to show that the 2013 Deed of Trust was intended to reference Lots 16 & 18.

B.
A REFORMATION CLAIM –
THE LAW OF AFFIRMATIVE DEFENSES: "LACHES"
AS APPLIED TO THE FACTUAL BACKGROUND

As of September 2013, PennyMac had knowledge that the property securing the 2013 Deed of Trust was vacant land. Lots 13, 15 & 17 were expressly described by Book and Page Number, by parcel #, and/or the result of a sale from Homer Wright to J. Furthermore, Brunswick County tax and registry records were available to the public, on-line., and identified said lots as vacant land. Based upon these facts, PennyMac is charged with ample notice of the "grounds" for PennyMac's reformation claim. *Stratton* at 712 S.E.2d 231. Also, *see Huss v. Huss*, 31 N.C. App. 463, 468, 230 S.E.2d 159, 162 (1976). PennyMac unreasonably slept on those grounds for over 6 years. *Stratton v. Royal Bank of Canada*, 211 N.C. App. 78, 88-89, 712 S.E.2d 221, 230 (2011). Further, PennyMac was not justified in failing to bring a reformation claim during such period. *Id*. Also, see *Teachey v. Gurley, 214 N.C. 288, 199 S.E. 83 (1938)*. Finally, PennyMac's unjustified delay prejudiced J in that J's ability to defend against PennyMac's reformation lawsuit was negatively influenced by PennyMac's delay in filing its reformation lawsuit. *Taylor v. City of Raleigh*, 290 N.C. 608, 622, 227 S.E.2d 576, 584 (1976). Specifically, based upon PennyMac's communications, J relied on the integrity of the 2013 Deed of Trust, **which worked to the disadvantage, injury, and prejudice of J.** Accordingly, justice demands that PennyMac be barred from pursuing its reformation claim under the affirmative defense of "Laches." *Stratton v. Royal Bank of Canada*, 211 N.C. App. 78, 88-89, 712 S.E.2d 221, 230 (2011); *Teachey v. Gurley, 214 N.C. 288, 199 S.E. 83 (1938)*; *Taylor v. City of Raleigh*, 290 N.C. 608, 622, 227 S.E.2d 576, 584 (1976). In other words, the doctrine of "Laches" denies equitable relief to PennyMac in the instant case.

C.
A REFORMATION CLAIM –
THE LAW OF AFFIRMATIVE DEFENSES: "UNCLEAN HANDS" AS APPLIED TO THE FACTUAL BACKGROUND

Notwithstanding the foregoing, J asserts the doctrine of "***unclean hands***," which equitably bars, or estops, PennyMac from bringing its ***reformation*** claim against J. *S.T. Wooten Corp. v. Front St. Constr. LLC,* 217 N.C. App. 358, 362, 719 S.E.2d 249, 252 (2011). In the instant case, PennyMac's conduct raises conflicts and her hands are not clean to be awarded the equitable relief of reformation. *Id*. Specifically, J bases his "***unclean hands***" argument upon PennyMac's misrepresentation and fraudulent schemes to take the property of J without just compensation.

IV.
CONCLUSION:
IMPLICATIONS OF THE LEGAL FINDINGS IN PART III

A.
EXTENDING THE CURRENT RESEARCH TO ADDRESS PENNYMAC'S POSSIBLE VIOLATIONS OF OTHER STATE COMMON LAW AND FEDERAL STATUTORY LAW

With a view toward extending the current research to address other possible violations of state common law and federal statutory law by PennyMac, based upon the factual background as presented in Part I, PennyMac's conduct implies the following possible violations of law.

State Common Law
- Breach of Contract Accompanied by Fraud.
- Breach of Contract (Deed of Trust).
- Breach of Fiduciary Duty (Deed of Trust).

Federal Statutory Law
- Violation of the Racketeer Influenced and Corrupt Organizations Act (18 U.S.C. §§ 1961-1968).
- Violation of the Fair Det Collection Practices Act of 1978 (15 U.S.C. §§ 1692-1692o).
- Violation of the Real Estate Settlement Procedures Act (RESPA).

B.
PENNYMAC'S IMMINENT CHANGE IN THE MANNER IN WHICH PENNYMAC CONDUCTS ITS LOAN SERVICING BUSINESS

This article argues that if the objectives of this article are satisfied, PennyMac, and a multitude of its stakeholders, will have an increased understanding that PennyMac's current conduct in operating its loan servicing business may result in violations of a variety of state common laws and federal statutory laws, as shown above. Furthermore, this article argues that such increased understanding, and the implications thereof, will likely motivate PennyMac to modify its business model in operating its loan servicing business, which will result in imminent changes to manner in which PennyMac conducts its loan servicing business. Such changes could include the following.

- PennyMac should never take money out of the bank account of a person without direct authority.
- PennyMac should never attempt to control real property for which PennyMac does not have an actual security or beneficial interest.
- PennyMac should never attempt to unlawfully collect a debt.
- PennyMac should strictly satisfy its contractual obligations.
- In exercising control over an escrow account, PennyMac must act reasonably.
- If PennyMac believes that it has a security or beneficial interest in certain real property through a Deed of Trust, which is not observable on its face, then it should pursue a claim for reformation within a court that has jurisdiction and venue.
- PennyMac should never attempt to become the unbiased, succeeding trustee/fiduciary of a Deed of Trust through an assignment by the current trustee (e.g., MERS) of a Deed of Trust.

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ZOOM UNIVERSITY: STUDENT PERSPECTIVES AND DIRECTIVES FOR THE FUTURE OF ON-LINE DELIVERY

Suzanne Collins, Karen Ward, and Jared Hansen


connection
opportunities
lockdown
understand
technology
browser
think
dates
asynchronous
making
know
semester
camera
option
issues
hard
relationships
understanding
zoom
use
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covid
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easier
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school
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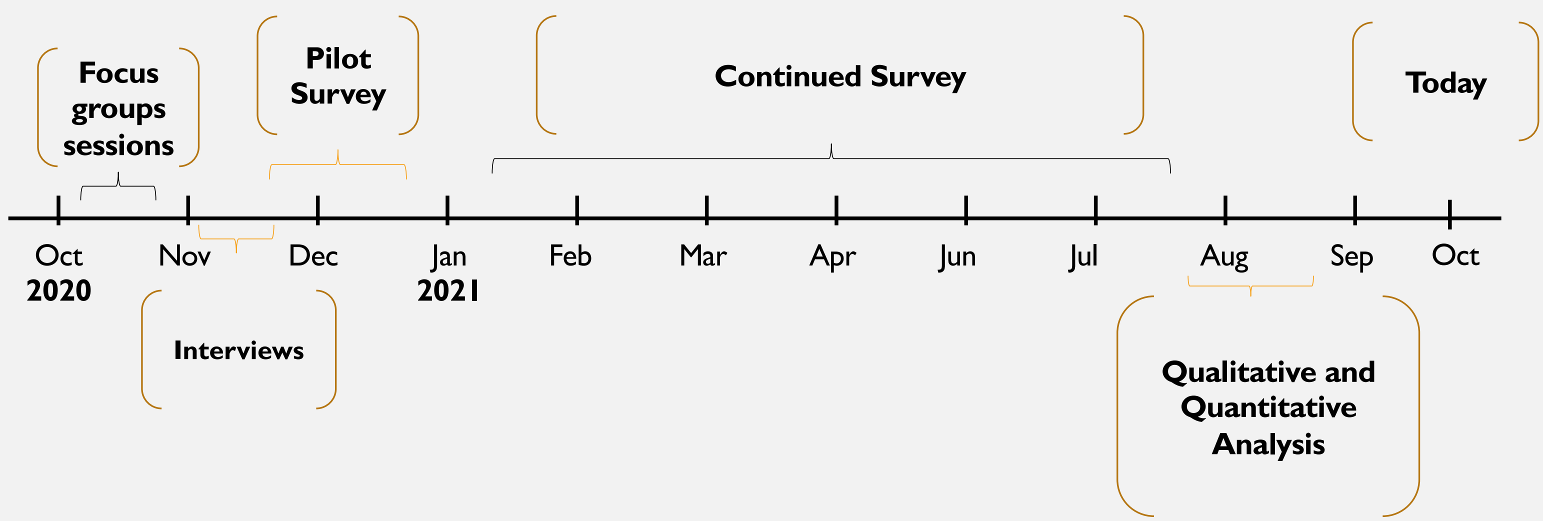
TIMELINE


Focus groups sessions
Pilot Survey
Continued Survey
Today
Oct 2020
Nov
Dec
Jan 2021
Feb
Mar
Apr
Jun
Jul
Aug
Sep
Oct
Interviews
Qualitative and Quantitative Analysis

WHAT PROMPTED THIS RESEARCH

Prompt 1: Conversations with students back home for Summer 2020

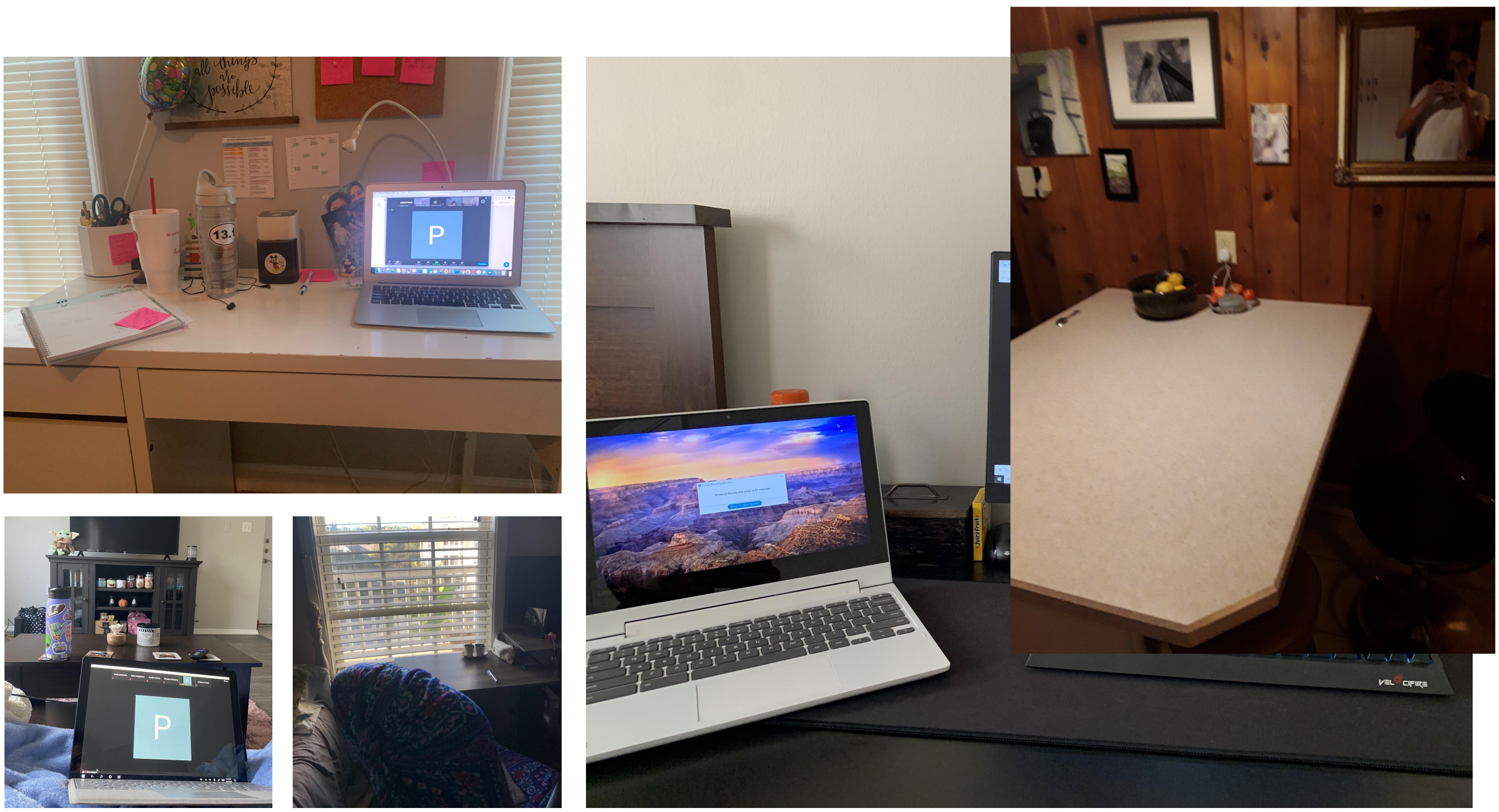
Q. *How is school going for you?*

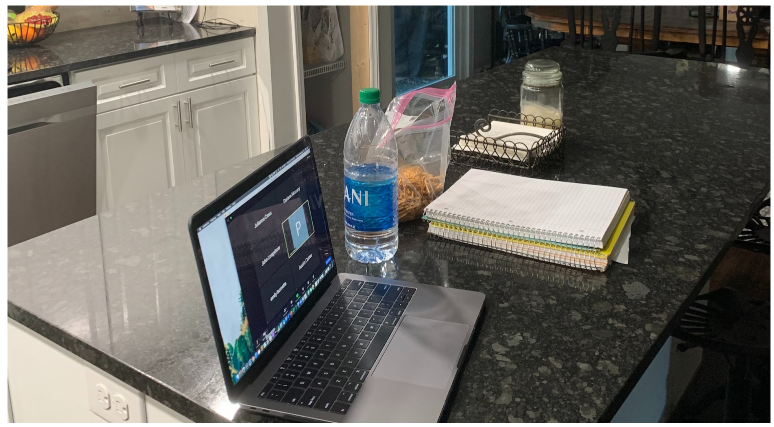
A. *Isn't everyone at "Zoom University?"*

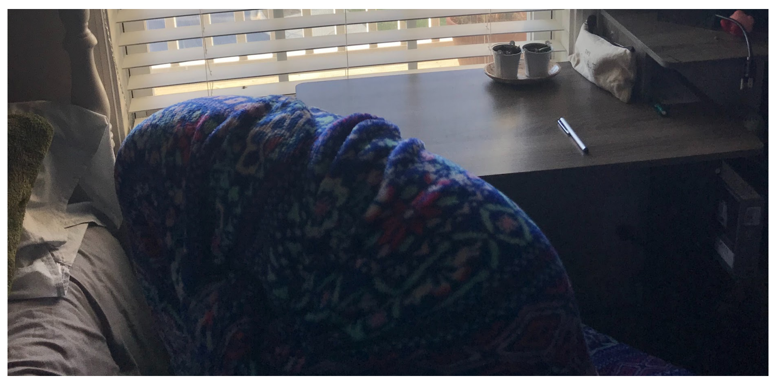
Prompt 2: The Focus Group Exercise

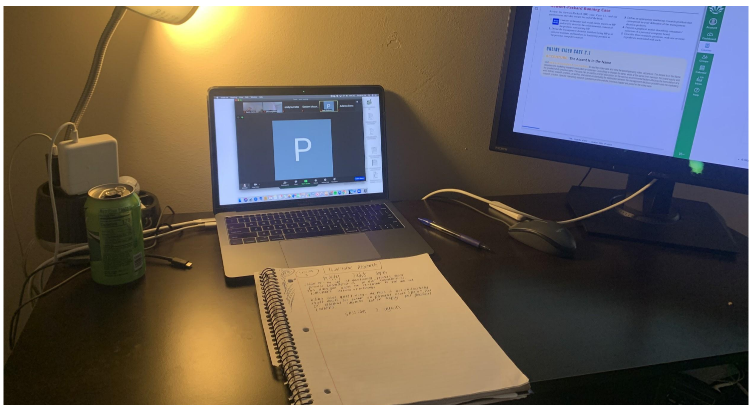
October 2020, an industry expert guest speaker conducted a demonstration focus group

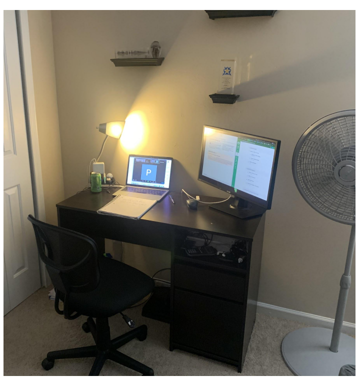
→*What does online learning mean?*

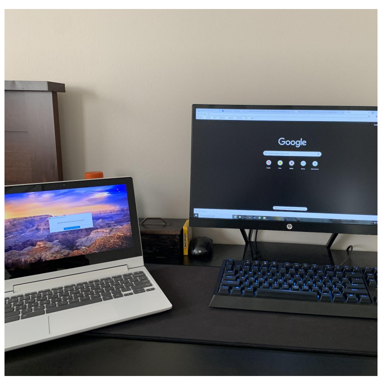








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PLAY NOW
ULTIMATE TEAM
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2013 SEASON
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MY NCAA
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GLORY
TEAM MANAGEMENT
SETTINGS
SELECT
BCS #24 CLEMSON (0.844), #25 USC (0.843)
SAMSUNG
John Longshore
P
Austin Cartee
emily burnette
Dariann Mccurry
Julianna Cress
Lite
DELL

THE RESEARCH

The Result: *the research project to investigate*

→ *What creates engagement in higher educational delivery during the pandemic*?

POPULATION AND SAMPLING

Population: The population for this study was defined as full-time, undergraduate and graduate students in the Charlotte, North Carolina area

Respondents: were of the minimum age of 18 years old and due to the pandemic receiving instruction on-line (synchronous and asynchronous delivery)

Total: 425 responses were returned over the sampling period from November 2020 thru July 2021

RESPONSE VALIDATION

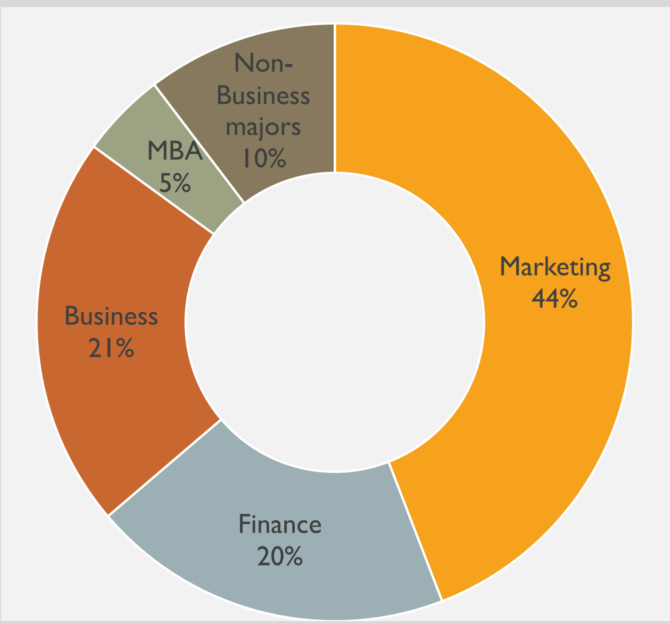
Initial Response: 425 - the total sample size received were from individuals greater than or equal to 18 years old

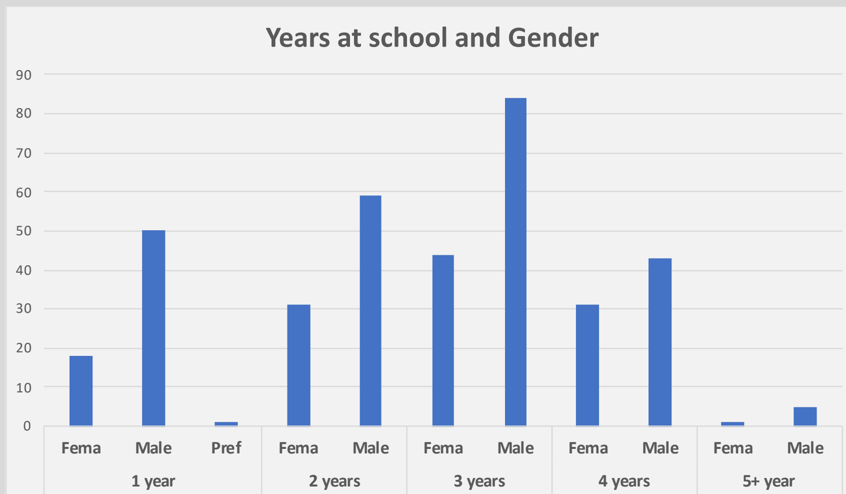
Completeness: questionnaires found to be incomplete were removed

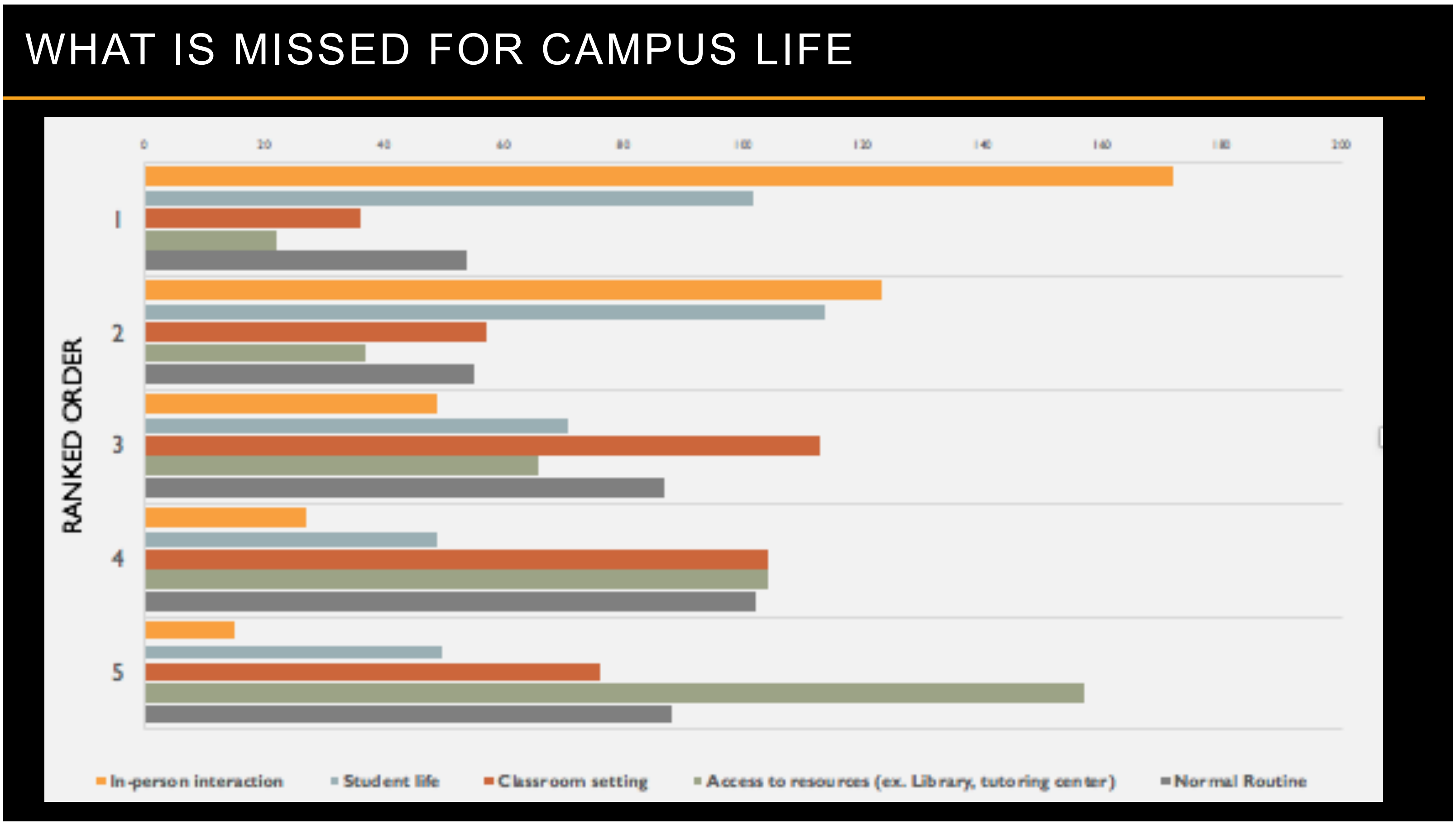
"Straight-lined" Surveys: Complete questionnaires were reviewed to ensure the informants carefully considered their answers and provided thoughtful responses, e.g., all "1" or all "7" (Herzog & Bachman, 1981; Kim, Dykema, Stevenson, Black, & Moberg, 2019); straight-lined, responses were removed

N=367 validated responses

DEMOGRAPHICS





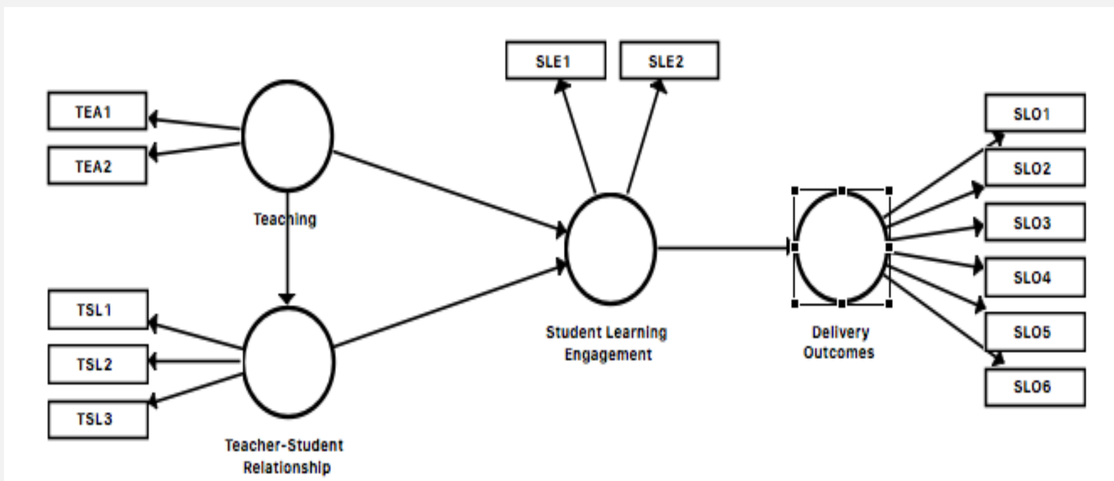

WHAT IS MISSED FOR CAMPUS LIFE
RANKED ORDER
1
2
3
4
5
In-person interaction
Student life
Classroom setting
Access to resources (ex. Library, tutoring center)
Normal Routine

HYPOTHESES

H1: Student preference for educational delivery will positively influence performance in online learning if aligned to preference

H2: Educational preferences modify the need increased engagement

H3: Online delivery which includes both synchronous and asynchronous delivery positively influences student engagement



THE RESULTS…AND THE IMPLICATIONS

- H1: Preference does not influence performance
- H2: Delivery preference does not decrease the need for engagement
- H3: Hybrid delivery demonstrates a slight increase in engagement

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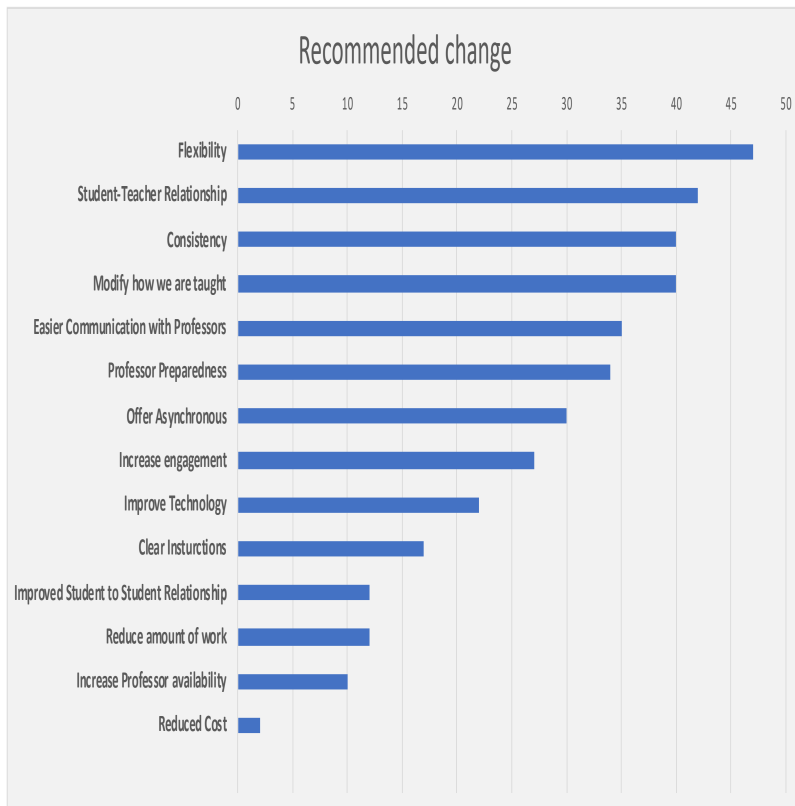
- What can we do, what have we done at the university level to provide increased engagement?
- What does this mean for the instructors and the universities going forward?
- Where are we seeing pockets of hybrid delivery that has significantly increased delivery?

QUALITATIVE ANALYSIS OF SUGGESTIONS FOR CHANGE



IMPLICATIONS FOR FUTURE STUDY

- At a university level, what is being done to fill the engagement gap?
- What can we do as instructors now to make an incremental change?
- How can we incentivize engaged delivery going forward?


THANK YOU

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