ACADEMY of ECONOMICS and FINANCE

PAPERS AND PROCEEDINGS

58th
ANNUAL MEETING

VIRTUAL CONFERENCE
FEBRUARY 10-13, 2021

editors

NICHOLAS MANGEE
MICHAEL TOMA

Academy of Economics and Finance

Papers
and
Proceedings

Volume 45, 2021

Fifty-Eighth Annual Meeting
Virtual Conference
February 10-13, 2021

Program Arranged by Mary Funck
Sam Houston State University

Editors

Nicholas Mangee, Georgia Southern University
Michael Toma, Georgia Southern University

2020-2021 AEF Leadership

President, Speros Margetis, University of Tampa

President Elect, Mary Funck, Sam Houston State University

First Vice President, Abeba Mussa, Farmingdale State College, State University of New York

Second Vice President, Marc Sardy, Rollins College

Secretary, Kath Henebry, University of Nebraska-Omaha

Treasurer, Richard M. Vogel, Farmingdale State College, State University of New York

Local Arrangements Chair, Marc Sardy and Richard Lewin, Rollins College

Directors

Robert Burney, Coastal Carolina University (SC) (2021)

Michael McLain, Hampton University (NC) (2021)

M. Kabir Hassan, University of New Orleans, (LA) (2022)

James Malm, College of Charleston (SC) (2022)

Brooke Conaway, Georgia College and State University (GA) (2023)

Phyllis Keys, Morgan State University (2024)

Richard Lewin, Rollins College (2024)

Recent Presidents

Academy of Economics and Finance

Volume 45	**Papers and Proceedings**	**2021**

Table of Contents

Investor Versus Non-investor Decision-making and Behavior

William C. Barbee, Jr. and Denise W. Streeter, Howard University

Abstract

On average, 52% to 55% of Americans invest in the financial markets according to the Federal Reserve's Survey of Consumer Finances. Using an original survey tool, this research aims to understand why the 55% of Americans identified in 2019 to invest do so and why the remaining 45% do not invest. Specific attention is given to reaching those families in the lower 49th percentile of usual income to determine what is keeping them from benefiting from the market's financial results that can increase financial wealth. Overall, society will benefit from this research that will address the "why" of investing behavior.

Introduction

Every three years, the Federal Reserve conducts a Survey of Consumer Finances (Bhutta et al, 2020). The most recent three reports (i.e., 2013, 2016, and 2019) from the survey show participation of 5,000 to 6,000 families on a range of topics related to household finance. This paper draws upon those reports to assess the status of the household's decisions to invest or not to invest in the financial markets.

Figure 1 presents the percentage of families with direct and indirect holdings of stock based on the 2013, 2016, and 2019 surveys (Bhutta et al, 2020, p 18). In total, the percentage who held stock has ranged from about 52% in 2013 to 55% in 2019. However, a further look at the split of the income distributions of those who held stock, shows that those in the lower 49th percentile of usual income held only 31% of stock in 2019 while those in the 50th to 80th percentiles held an average of 70% in stock and those in the 90th to 100th percentiles of usual income held close to 90% in stock either directly or indirectly. The figure clearly shows the income differentials among investing families. However, there also could be other factors that have resulted in the 10% (of the upper income) to 69% (of the lower income) families to not invest in stock (or more broadly, the financial markets). Using an original survey tool, this research aims to understand why the 55% of families identified in 2019 to invest do so and why the remaining 45% (i.e., "non-investors") do not invest. Specific attention is given to reaching those families in the lower 49th percentile of usual income to determine what is keeping them from benefiting from the market's financial results that can increase financial wealth.

Figure 1: Families with direct and indirect holdings of stock, 2013-2019 surveys
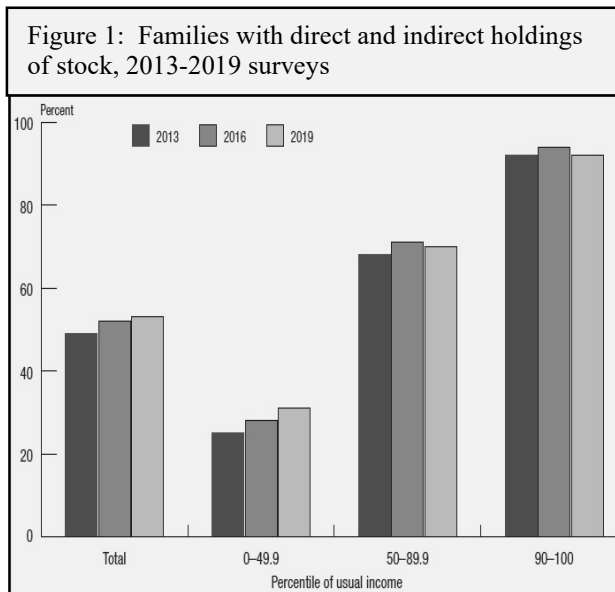
Literature Review

The existing literature identifies several factors that can explain decisions to invest or not to invest in the financial markets. Limited or no disposable income could keep families from investing. A lack of understanding of the financial markets or scandalous corporate events could be factors. Additionally, influences such as politics, religion, family size, or even birth order, could impact one's decisions to invest or not to invest. The goal of this research is to determine the factors that cause some to be investors and others to remain as non-investors even given the financial benefits of investing.

In a review of research that utilized a survey tool, the researchers selected two key papers. First, Grable and Joo (2004) developed an original own survey of 460 respondents from two large universities. Second, Campbell (2006) drew data from the Federal Reserve's Survey of Consumer Finances of 4,300 respondents. However, their dependent variables were different. Grable and Joo (2004) looked at financial risk tolerance while Campbell (2006) evaluated the holdings of private equity and/or private businesses by the investors. Regarding independent variables, Grable and Joo (2004) looked at a host of environmental factors such as age and gender as well as biopsychosocial factors such as self-esteem. Campbell's study, on the other hand, used traditional variables as found in the Federal Reserve's survey. This research aims to extend both prior studies.

One task is to resolve the conflict in the findings of the two papers on the role that income plays in investing decisions. Grable and Joo (2004) found that household income was the most important factor for explaining the variance in the risk tolerance scores. However, Campbell (2006) showed that the evidence presented does not show a consistent statistically significant relationship between income and participation in the public equity markets. The resolution of these conflicting results will clarify whether income is a determinant of the decisions for investors versus non-investors.

In addition, six other variables of this research are based on the findings from existing literature. The goal remains to understand the factors that distinguish the decision-making and behavior of investors versus non-investors.

The education variable has been studied in three papers of existing literature. First, Grable and Joo (2004) found that those who have a bachelor's degree or higher level of education as compared to the lower education group show higher levels of financial risk tolerance. Second, Campbell (2006) report a strong statistically significant and positive relationship between the level of education and participation in the stock market. Specifically, Campbell (2006) stated that "education directly predicts equity participation even after controlling for age, income, and wealth". Third, Gilliam and Chatterjee (2011) found that higher levels of education are positively associated with higher levels of risk tolerance.

Regarding risk tolerance, studies examine the amount of uncertainty that investors will bear for the return to be earned. Grable and Lytton (1999) developed and validated the risk tolerance survey that will be incorporated into this research to reach the expanded distribution. The validity of this instrument was substantiated by the high correlation coefficient between the scores of the 13-item financial risk assessment instrument and the Survey of Consumer Finances risk assessment. Kimball et al (2008) found a strong direct positive relationship between this applied measure of risk tolerance and the share of household financial wealth allocated to stocks.

For the variable of spirituality, two papers have addressed this topic. First, Miller and Hoffman (1995) and Hillary and Hui (2009) found that religiosity is in general positively related to risk aversion. That finding is in opposition to the work of Renneboog and Spaenjers (2012) where they studied financial decisions between religious and non-religious households. Using Dutch survey data, they found that religious households are more likely to save while Catholic households invest less frequently in the stock market. In addition, Catholics and Protestants considered themselves more trusting, care more about leaving money to their children, and have longer planning horizons than non-religious households. This study incorporates spirituality as a variable to determine its role in the decision making of investors versus non investors.

Two researchers have studied birth order as a factor in investing decisions. Grable and Joo (2004) found that the evidence presented did not show a statistically significant relationship between the factor of birth order and financial risk tolerance. However, Gilliam and Chatterjee (2011) show that first born persons are significantly less tolerant of risk and more financially risk averse than later born persons. One possible explanation for this finding is that firstborns are more likely to identify with their parents and therefore be affected by parental pressures that encouraged them to be responsible, dependable, and not take unnecessary chances or risks.

A look at the research on the impact of family composition on investing decisions revealed similar findings when considering more "sandwiched" households that include the head of household caring for both young children and elderly parents. Bogan (2015) found that if there are elderly family members in the home, people take fewer risks to ensure that funds are available to care for the elderly. On the other hand, Bogan (2015) showed that families with children-only versus those with both dependent children and elders, invest differently. Families with only dependent children invest 93% of their funds in safe assets, 39% in risky assets, and 14% in tax-advantage assets. It is noted that the percentages are greater than 100% as respondents likely could select more than one choice. However, the findings differ once elderly dependents come into the home whereby the percentage of safe assets goes up to 100% and the percentage of risky assets invested in goes

down. This variable will be examined with a broader sample of respondents to determine the current relation to investing behavior.

The last of the variables of this study are events that have been publicized in the media and could impact one's decisions to invest or not to invest. Giannetti and Wang (2018) found that after a revelation of corporate fraud, a households' stock market participation decreased in holdings of both the fraudulent as well as non-fraudulent firms. The association of the non-fraudulent firms was seen in Giannetti and Wang's (2018) results when even the clients of accounting firm Arthur Andersen experienced a large decrease in stock market reaction. The survey tool of this study captures the impact of both current and major prior events such as the Tulsa Massacre of 1921 (History.com, 2021) that has been reported in the recent news. It is anticipated that awareness of even long prior events can have an impact on investing decision making.

Methodology

The methodology for this study includes an original survey designed to measure 14 factors of impact on investing based on the existing literature and the researchers' experience to answer the question "What factors distinguish investors from non-investors?" or "Why don't people invest?". This survey will be distributed nationwide via Qualtrics through various networks to reach adults of multiple backgrounds who are both investors and non-investors. The data will be assessed via multivariate logit analysis. The dependent variable will be the participants' self-identification as an investor or non-investor using zero or one indications in the logit analysis equation as follows:

$$
\begin{aligned}
Investor\ (1)\ or\ &Noninvestor\ (0) = \\
\alpha_j\ +\ &\beta_1\ Gender\ +\ \beta_2\ Age + \beta_3\ Race\ + \\
\beta_4\ MaritalStatus\ +\ &\beta_5\ Education + \beta_6\ Location\ + \\
\beta_7\ Spirituality\ +\ &\beta_8\ PoliticalAffiliation\ + \\
\beta_9\ Birth\ Order\ +\ &\beta_{10}\ FamilyComp\ + \\
+\ \beta_{11}\ Income\ +\ &\beta_{12}\ Employment\ + \\
+\beta_{13}\ Risk\ Tolerance\ +\ &\beta_{14}\ Events + \epsilon_{jt}
\end{aligned}
\tag{1}
$$

This logistic regression equation will be tested using an original survey distributed nationally through a stratified sampling technique to obtain a sample representative of the population of the United States. Each variable will add new knowledge given the broad base of the study sample.

Contributions

This research will contribute to the existing literature by using a larger number of participants in the U.S. from representative backgrounds. In addition, the binary dependent variable of the investor versus non-investor designation will be used as opposed to the risk tolerance variable in most papers. Lastly, the researchers expand the list of independent variables to attain support for or refute the conflicts in the research results of existing literature. Overall, society will benefit from this research that will address the "why" of investing decisions.

Acknowledgments

References

Aharon I (2012) Is it betrayal aversion or regret aversion? Recherches Économiques De Louvain, 78(3), 101-114, doi:10.3917/rel.783.0101

Backman M (2019) The reason 55% of Americans aren't investing. Retrieved from: https://www.fool.com/retirement/2019/07/28/the-reason-55-of-americans-arent-investing.aspx

Bhutta N, Bricker J, Chang AC, Dettling LJ, Goodman S, Hsu JW, Moore KB, Reber S, Volz AH, Windle RA, Bi K, Blair J, Hewit J, Ruh, D. (2020). Changes in U.S. family finances from 2016 to 2019: Evidence from the survey of consumer finances. Federal Reserve Bulletin, 106(5), 1-42. Retrieved from: https://www.federalreserve.gov/publications/files/scf20.pdf

Bogan VL (2015) Household asset allocation, offspring education, and the sandwich generation. The American Economic Review 105(5): 611-615, doi:10.1257/aer.p20151115

Campbell JY (2006) Household finance. The Journal of Finance 61(4): 1553-1604, doi:10.1111/j.1540-6261.2006.00883.x

Comen E, Frohlich T (2020) The biggest corporate scandals of the decade. Retrieved from: https://247wallst.com/special-report/2019/12/20/the-biggest-corporate-scandals-of-the-decade/

Giannetti M, Wang TY (2016) Corporate scandals and household stock market participation. The Journal of Finance 71(6): 2591-2636, doi:10.1111/jofi.12399

Gilliam J, Chatterjee S (2011) The influence of birth order on financial risk tolerance. Journal of Business and Economics Research 9(4): 43-50

Grable J, Lytton RH (1999) Financial risk tolerance revisited: The development of a risk assessment instrument. Financial Services Review 8:163-181, doi:10.1016/S1057-0810(99)00041-4

Grable JE, Joo S (2004) Environmental and biopsychosocial factors associated with financial risk tolerance. Financial Counseling and Planning 15(1):73. Retrieved from: https://search.proquest.com/docview/1365272307

Grinblatt M, Han B (2005) Prospect theory, mental accounting, and momentum. Journal of Financial Economics 78:311- 339

Hilary G, Hui KW (2009) Does religion matter in corporate decision making in America? Journal of Financial Economics 93: 455-73

History.com Editors (2021) Tulsa race massacre. Retrieved from: https://www.history.com/topics/roaring-twenties/tulsa-race-massacre

Kimball MS, Sahm CR, Shapiro MD (2008) Imputing risk tolerance from survey responses. Journal of the American Statistical Association 103(483): 1028-1038, doi:10.1198/016214508000000139

Lee, M. (2019). Black households try to close wealth gap by chasing higher returns. Retrieved from: https://www.cnbc.com/2019/05/17/black-households-try-to-close-wealth-gap-by-chasing-higher-returns.html

Loury GC (1998). Opting out of the boom; why more blacks don't invest. Retrieved from: https://www.nytimes.com/1998/06/07/magazine/opting-out-of-the-boom-why-more-blacks-don-t-invest.html

Miller AS, Hoffmann JP (1995) Risk and religion: An explanation of gender differences in religiosity. Journal for the Scientific Study of Religion 34(1): 63–75 https://doi.org/10.2307/1386523

Mohan P (2019) These are the worst scandals of the past decade. Retrieved from: https://www.fastcompany.com/90444328/these-are-the-worst-scandals-of-the-last-decade

Mokhtari M (2018) Guest editor's introduction to the special issue on health and consumer finance. Financial Counseling and Planning 29(1):4-5, doi:10.1891/1052-3073.29.1.4

Pasewark WR, Riley ME (2010) It's a matter of principle: The role of personal values in investment decisions. Journal of Business Ethics 93(2): 237-253, doi:10.1007/sl0551-009-0218-6

Renneboog LDR, Spaenjers C (2012) Religion, economic attitudes, and household finance. Oxford Economic Papers 64(1): 103-127, doi:10.1093/oep/gpr025

Tymoigne E (2007) A hard-nosed look at worsening U.S. household finance. Challenge 50:88-111, doi:10.2753/0577-5132500406, Retrieved from: http://www.tandfonline.com/doi/abs/10.2753/0577-5132500406

Vermeulen P (2016) Estimating the top tail of the wealth distribution. The American Economic Review 106(5):646-650, doi:10.1257/aer.p20161021

Walby S (2013) Finance versus democracy? theorizing finance in society. Work, Employment and Society 27(3):489-507, doi:10.1177/0950017013479741

The Impact of Data Breaches on Commercial Banks' Lending Practices

Asligul Erkan Barlow, East Carolina University
Rajni Goel and Denise W. Streeter, Howard University

Abstract

Over the last twenty years, firms and banks have become increasingly vulnerable to cyberattacks where sensitive information is compromised. Existing research demonstrates that firms significantly increase their cash holdings for precautionary reasons upon experiencing a security breach. This study extends the research of effects of a cybersecurity incident by investigating the impact of a reported information-security-related incidents on the lending practices of commercial banks. The results of this study can be leveraged by bank management to analyze their current investments in cybersecurity to better manage the risk of a breach interfering with the bank's role of financial intermediation

Introduction

Electronic business with digital databases and transactions are now a core component in the world economy. Reports of data breaches and damages due to cyberattacks have become regular occurrences. Though cybersecurity investments are rising (Cavusoglu, et al., 2004), there has been an increase in the number of data breaches over time with impacts on various levels. More recently, information-security-related incidents have become an increasing concern especially for financial service firms, who potentially may experience up to 300 times more cyber-attacks per year than other firms (Boston Consulting Group, 2019). This research aims to study the economics of cyber security breaches at commercial banks that have a financial intermediary responsibility. Specifically, the researchers seek to understand the risks presented by cyber-attacks at U.S. commercial banks and to quantify how a cyber incident impacts lending.

According to Statista (2018), there were 662 reported data breaches in 2010. By 2017, there were 1,579 reported data breaches, which is an increase of 138.50%. They further report that cybersecurity costs have grown from $27.4 billion in 2010 to $60.4 billion in 2017. Tangible costs are met with intangible costs to the company or the customer that are frequently not measurable. Damage to corporations has appeared in the form of time variant stock market reactions to the cyberattack announcements (Campbell et al., 2003; Cavusoglu et al., 2004; Gatzlaff and McCullough, 2010; Gordon et al., 2011) in which, over time, negative reactions become significant, and investors start to differentiate between the type of breach that was announced. For example, research shows that a negative stock market reaction results only if the company experiences a decline in sales but no reaction if customers experience personal data breaches. This research on measuring the lending disruptions assists in quantifying potential intangible benefits of strategic targeted security investments made by the management in the financial sector.

Literature Review

A review of the existing literature shows that this research dates to the early 2000s. The early literature focused mostly on the stock market reaction to breach announcements with a few papers that studied why some companies are more exposed to breaches than others. This research will draw upon the literature related to the reactions of individuals, non-financial corporations, and banks on cybersecurity breaches.

Individuals who are financially harmed by a cybersecurity breach have had reactions of which some are anticipated to apply to customers of financial institutions. Cyberattacks that involve personal financial information loss cause significant shareholder wealth loss as attacked firms experience declines in sales growth, credit ratings, and risk appetite (Kamiya et al., 2020). Consumers who were exposed to the 2012 South Carolina Department of Revenue data breach adopted fraud protection practices. They, however, did not change their credit usage or interaction with the credit market (Mikhed and Vogan, 2018). Financially harmed individuals attribute the loss of personal data to negligence and are more likely to sue the company (Romanosky et al., 2014). This research team hypothesizes that customers of financial institutions that experience a cybersecurity breach will respond with a withdrawal of deposits from the bank due to similar views of negligence.

This response would be in line with the behavior found in existing studies whereby the firm seems to anticipate reduced access to cash from customers. Garg (2020) found that breached firms increase cash holdings after a cyberattack. Boasiako and Keefe (2020) also found that firms increase cash holdings after both a data breach experience and the passage of data breach disclosure laws. Their findings were more significant with large, old, financially constrained, and high-growth firms. This research team builds on the research findings on non-financial firms to test the response of financial institutions to a cybersecurity breach.

With a specific look at the existing literature on the response of banks to adverse situations, several papers are relevant. Lending, et al (2018) saw that breached banks experience an approximately 10% decline in bank deposits relative to the matched banks. Streeter (2018) found a significant relationship in the influence of total deposits on the lending activity of small and medium sized banks during the 2008 financial crisis. Clair and Tucker (2013) concluded that banks that maintain higher capital ratios are severely limited in ability to extend new credit. Dahiya, Saunders, and Srinivasan (2003) found that financial distress of existing lending relationships led to negative returns for the bank. Kashyap and Stein (2000) reported that banks with less liquid balance sheets had to be stimulated with monetary policy to continue in their lending role. Streeter (2018) confirmed that U.S.-based commercial banks responding positively to monetary policy during the 2008 financial crisis with increased commercial lending. This research team hypothesizes that financial institutions are likely to also increase cash holdings while reducing lending due to the anticipation of decreases in customer deposits.

Other studies explored various impacts of firms across industries that have been breached but few more specifically on breached banks effects. No research has reported findings on this study's research question of, "What is the impact of data breaches on the lending of US-based commercial banks?"

Theoretical Model

The theoretical model, Figure 1, is developed to depict a significant relationship between data breaches and bank lending in the subsequent period after a cybersecurity breach incident. Considering the previous literature, both bank deposits (Kashyap and Stein, 2000 and Streeter, 2018) and cash holdings (Garg, 2020) have a positive relationship with lending. To account for this in the model in Figure 1, the researchers hypothesize that if, after a cybersecurity breach, financial institutions experience a decline in bank deposits or engage in stockpiling (or increasing) cash holdings, then there will be a negative effect on bank lending. However, a set of literature additionally illustrated in time variant market reactions, there could be no change in consumer habits because banks and its customers become insensitive to data breaches. If such insensitivity had occurred, then potentially, no relationship between bank data breaches and lending may occur. This model also considers these phenomena.

Figure 1: Theoretical Model
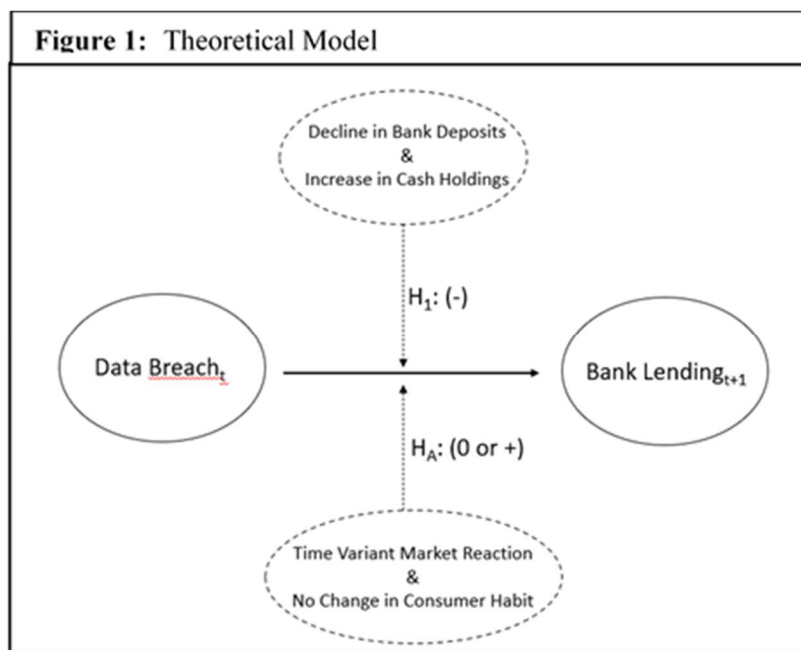
Data and Scope of Study

For this study, the data was obtained from the Privacy Rights Clearinghouse (PRC) database for the years of 2005 through 2018. The entire PRC database for that period includes 9,015 incidents of cybersecurity breaches of all types for all entities. For business entities, there were 2,455 incidences of breaches during the stated period. When only financial institutions were considered, there were 788 incidences. However, this study accounts for the fact that not all financial institutions are depository entities that engage in lending. The resulting sample reflects 139 breach incidents at depository financial institutions based on identification of the SIC codes in the 60 and 61 series for each breached entity. Those 139 breach incidents occurred at 56 commercial banks, which is the sample size of this study. Many of the banks experienced multiple breaches over the quarters of the 14-year study period.

Two components of the summary statistics describe this data. Table 1 provides insight into the eight types of breaches experienced by the 56 banks of this study. It must be pointed out that 36 of the 139 breaches (or 26%) were carried out by insiders of the bank and were the largest number of incidents of all the types of breaches. The second largest number of breaches were those of portable devices that were physically stolen, or data was removed from memory sticks. SD cards, or other means. Incidents of being hacked or infected by malware of outside parties are the third largest number of breaches though it is the type most reported on by the media.

Two other types of breaches of interest are "Unknown" and "Unintended disclosure". An "Unknown" breach occurs when there is not enough information about the breach to know how exactly the information was exposed. However, it is clear that some personal data was compromised. An "Unintended disclosure" is an accidental disclosure of personal information through sensitive information being posted publicly, mishandled, or sent to the wrong party via publishing online, sent erroneously in an email, sent in a mailing, or sent via fax whereby the data is exposed to interception by those other than the intended party. These types of "Unintended disclosures" could be considered human error as intentional insider release of the data is not readily apparent.

Lastly, the least frequent types of breaches for this study period include those that impact: (1) payment cards, (2) physical loss, and (3) stationary devices. Payment card breaches involve skimming devices at point-of-service terminals that withdraw funds from debit and credit cards. Physical loss encompasses breaches in which paper documents are lost, stolen, or discarded. Stationary devices are non-mobile computers or servers that were lost, inappropriately accessed, stolen or discarded. The various types of breaches will be included in the variables of this study. This information will be useful to the bank's development of strategies to combat cybersecurity breaches based on the type of breach.

Table 1: Summary Statistics, by type of breach

Type of Breach	Number of Incidents
Insider	36
Portable Device	28
Hacking or Malware	21
Unknown	17
Unintended Disclosure	14
Payment Card Fraud	14
Physical Loss	6
Stationary Device	3
Total Breaches	139

Table 2 presents the summary statistics based on the year of the breach. Two years stand out as outliers in the data. The year 2009 reflects the highest loss at 130 million records stolen. The year 2016 is concerning with zero number of records stolen from the 56 banks of this study. Such seeming exceptions in the dataset are important to note based on observation of the 251 million records stolen in total from depository financial institutions for 2005 through 2018.

Table 2: Summary Statistics, by year

Year	Number of Breaches	Number of Records Stolen
2005	10	9,804,000
2006	21	2,718,417
2007	9	136,327
2008	14	29,551,798
2009	4	130,000,000
2010	20	604,394
2011	11	362,797
2012	15	262,937
2013	12	623,000
2014	8	76,000,000
2015	3	410
2016	0	0
2017	4	128,999
2018	8	1,504,794
Total	**139**	**251,697,873**

In addition to the PRC data on the breaches, the researchers utilize quarterly financial data from the Federal Financial Institutions Examinations Council (FFIEC) for both breached and non-breached financial institutions of the same size based on total assets. This data will aid the researchers in answering the research question of, "What is the impact of data breaches on the lending practices of U.S.-based commercial banks?"

Methodology

To answer the research question, this study compares the 56 breached banks with a matched sample of non-breached banks. The matched sample is selected based on total assets and data available for all variables in the quarter of the breach as well as three quarters before and after the breach. With 139 breach incidents each analyzed over seven quarters, there are 1,946 observations given at least two banks – one breached and one non-breached.

Using the change in the natural logarithm of the dollar value of loans as the dependent variable, the researchers conduct a regression analysis with an array of variables known to impact lending at depository financial institutions. Though presented as a single dependent variable, total loans as well as each type of loan will serve as the dependent variable in the multiple models of the regression equation. The types of loans include those for: (1) agricultural, (2) commercial and industrial, (3) individuals, (4) real estate; (5) other depository institutions, and (6) foreign governments.

Specifically, equation (1) depicts as the regression specification.

$$\Delta Ln\_Loans_i = \beta_0 + \beta_1 Breached_i + \beta_2 X_i + \varepsilon_i \tag{1}$$

where,
- ΔLn_Loans = Change in the natural logarithm of loans of various types issued in the quarters before and after the breach announcement
- $Breached$ = Dummy variable that takes the value of one if the bank experienced a breach and zero otherwise
- X = Set of control variables (Streeter, 2018; Kashyap and Stein, 2000):

- Total Assets
- ΔCash
- Cash/Assets
- ΔDeposits
- Deposits/Assets
- ΔEquity
- Equity/Assets

- Return on Assets (ROA)
- Net Interest Margin
- Central Bank Reserves/Assets
- Monetary Policy
- Bank and Time Fixed Effects
- Type of Breach
- Number of records stolen

The significance of any of the stated variables will determine the impact on the change in loans for both the breached and non-breached banks of this study.

Conclusion

Based on a univariate analysis of the data, the researchers observed a decrease in lending by the breached banks in the quarters following the breach. The same pattern of decreases in lending is not seen in the non-breached banks. The multivariate regression analysis will inform this study through a determination as to the significance of a change in cash holdings, change in deposits, or other factors on this decrease in lending of various types.

After the completion of this study, the researchers aim to undertake future research on another aspect of lending related to cyber-attacks. Such future studies will examine breaches at non-financial firms to answer two research questions. First, "Do breached companies have less or greater success at getting bank loans?". Second, "What obstacles do breached companies encounter when they approach the bank for financial services?" It is believed that a continuation of the impact of cybersecurity breaches on both the lending and receiving of loans will make valuable contributions to the financial and information technology literature.

Acknowledgments

References

Boasiako KA, Keefe MO (2020) Data breaches and corporate liquidity management. European Financial Management, 1-24, doi:10.1111/eufm.12289

Boston Consulting Group (2019) Global Wealth 2019: Reigniting Radical Growth

Campbell K, Gordan LA, Loeb MP, Zhou L (2003) The economic cost of publicly announced information security breaches: empirical evidence from the stock market. Journal of Computer Security 11:431-448

Cavusoglu H, Mishra B, Raghunathan S (2004) The effect of internet security breach announcements on market value:

Capital market reactions for breached firms and internet security developers. International Journal of Electronic Commerce 9(1): 69–104

Chatterjee S, Gaob X, Sarkara S, Uzmanoglua, C (2019) Reacting to the scope of a data breach: The differential role of fear and anger. Journal of Business Research 101:183–193, doi:10.1016/j.jbusres.2019.04.024

Clair RT, Tucker P (1993) Six causes of a credit crunch (or why is it so hard to get a loan?). Economic Review – Federal Reserve Bank of Dallas, Third Quarter, 2 – 20

Dahiya S, Saunders A, Srinivasan A (2003) Financial distress and bank lending relationships. The Journal of Finance 58(1): 375–399, doi:10.1111/1540-6261.00528

Eisenbach TM, Kovner A, Lee MJ (2020) Cyber risk and the US financial system: A pre-mortem analysis. Federal Reserve Bank of New York Staff Reports 909:1-42

Garg P (2020) Cybersecurity breaches and cash holdings: Spillover effect. Financial Management 49(2):503–519, doi:10.1111/fima.12274

Gatzlaff KM, McCullough KA (2010) The effect of data breaches on shareholder wealth. Risk Management and Insurance Review 13(1):61-83, doi: 10.1111/j.1540-6296.2010.01178.x

Gordan LA, Loeb MP, Zhou L (2011) The impact of information security breaches: Has there been a downward shift in costs? Journal of Computer Security 19:33–56, doi 10.3233/JCS-2009-0398

Kamiya S, Kang J, Kim J, Milidonis A, Stulz RM (2021) Risk management, firm reputation, and the impact of successful cyberattacks on target firms. Journal of Financial Economics 139(3):719-749, doi:10.1016/j.jfineco.2019.05.019

Kashyap AK, Stein JC (2000) What do a million observations on banks say about the transmission of monetary policy? The American Economic Review, 407-428

Lending C, Minnick K, Schorno PJ (2018) Corporate governance, social responsibility, and data breaches. The Financial Review 53(2):413–455, doi: 10.1111/fire.12160

Mikhed V, Vogan M (2018) How data breaches affect consumer credit. Journal of Banking and Finance 88:192–207, doi: 10.1016/j.jbankfin.2017.12.002

Romanosky S, Telang R, Acquisti A (2011) Do data breach disclosure laws reduce identity theft? Journal of Policy Analysis and Management 30(2):256-286

Streeter DW (2018) The response of US-based commercial banks to credit stimuli. Banking and Finance Review 1:81-111

Teaching Finance in a Time of COVID-19

Christine A. Jubelt, Marc J. Sardy, and Richard A. Lewin, Rollins College, FL.

Abstract

Finance pedagogical innovations during COVID-19 provide a framework for effective strategies to enhance hybrid teaching, whilst assessing shortcomings and advantages to virtual learning. To facilitate an effective on-line methodology in finance education, obstacles to virtual learning such as technological issues, instructor and student stressors, isolation, student engagement concerns, and student preferences to interact in-person are considered. Advantages such as contact time, increased classroom sizes, and business education applied directly to the changes in businesses' practices are also explored. Additionally, the paper examines dimensions of engagement, such as active versus passive learning, the complexity for faculty, and ultimately implications for class-size.

Introduction

COVID-19 has presented one of the biggest, most challenging obstacles to education in the 21st century. Previously, the most severe pandemic faced was the Spanish flu epidemic of the early 1900s, when millions died, and many fled to communities outside of major cities to avoid exposure. These extreme difficulties caused chaos around the world that placed a plethora of activities on hold until the pandemic eventually broke. In the early 21st century, there were several near misses already with avian flu, swine flu, and other medical pandemics that were caught sufficiently early that damage was minimized. However, the world has now been facing a novel pandemic that unfortunately was not contained early enough to minimize its global impact. COVID-19 rapidly spread around the world via a multitude of countries and into the farthest reaches that previously had not been exposed to pandemics of this nature. From an educational standpoint, university students remain at higher risk for contracting and spreading the disease, due to the social nature of the lifestyles that college students typically enjoy. Competitive sports, study groups, large class lecture theatres, and even smaller class discussion sessions become havens for contagion and the spread of disease. Many institutions found themselves compelled to switching to online learning modalities, virtually overnight, as a way of continuing education whilst minimizing inherent exposure risks of students due to the contagion of COVID-19. However, given new technologies available for education, some historic challenges were to some extent mitigated.

With unanticipated lockdowns happening across America throughout 2020, many institutions faced deciding whether to allow students to remain on campus, or to transition to exclusive online modalities for classes. For larger institutions, this was perhaps less of a culture shift, as many of their courses have already been set up for online participation. Therefore, for students at these institutions the shift was more minimal and the experience for students somewhat seamless, despite residency on campus becoming impractical in many cases. COVID-19 infection rates started to ramp up in particular earnest around the time of spring break where many college students were gathering in various locations around the country for the annual ritual of breaking from their learning schedule for a week to enjoy themselves. This became a super spreader event across much of the country such that most universities and colleges declined to allow students back on campus thereafter. Instead, students were expected to continue education from remote locations, home, apartments and in the rare case of international students from isolated and segregated dormitories. Although, this behavior was not uniform across the country, many institutions chose this route for the safety of their staff, students, and their students' families.

Professors across the nation thus faced a truly novel experience. Many had to shift their approach to teaching to embrace exclusively online teaching modalities for the first time. For some, this was not a difficult shift as they were generally incorporating aspects of this modality prior to COVID-19. However, many found themselves in increasingly empty large lecture halls with most students attending classes remotely instead (Krishnamurthy, 2020). Under such new scenarios, professors were no longer teaching in front of large classrooms or even small lecture theaters, but instead teaching in front of web cameras often in improvised settings within their own homes. Many incidental accessories including web cameras, microphones and Bluetooth headphone systems became mainstays. Modalities of course delivery also changed due to COVID-19 creating two, less customary alternatives to traditional face-to-face in-class course delivery. The more common modalities becoming online and hybrid. These methods use more engagement to help student comprehension but require a very different course preparation.

This paper examines these different modalities and assesses various techniques available for helping students better understand the world of finance. This includes methods that will make revised teaching modalities more effective for student learning outcomes and addresses some of the challenges that professors faced depending on the size of their institution and the size of their classes. Inevitably, new modalities, methodologies and techniques are being developed continuously, but the following discourse will serve as a guide for those looking to teach more effectively, while facing the constraints on their courses created by dealing with a pandemic.

Literature Review

The global COVID-19 pandemic has affected lives surrounding education in unprecedented ways. To contain the contagious COVID-19 virus, students and educators were unable to maintain traditional in-person classroom teaching. Safety measures called for sudden modifications in higher education teaching methodology globally. Colleges and Universities closed campuses, suspended in person learning and moved to remote learning. These changes took place almost overnight, with university and academic staff required to move in person teaching to online virtual, hybrid and blended instruction formats almost instantly and with very limited support. The reality of the unanticipated difficulties surrounding a shift in teaching and pedagogy of this magnitude is supported with the fact that roughly 55% of faculty in the US had never taught virtually, according to Boyer-Davis (2020). Professors and instructors were not prepared or convinced that virtual learning was effective, with 36% claiming that virtual instruction does not yield equivalent learning outcomes over an in person classroom setting. In addition, 6 out of 10 faculty reported being uncomfortable and lacked experience using effective classroom technologies. Furthermore, approximately 40% of educators lacked the technological support to successfully teach online. In part, this was due to smaller colleges being unable or unwilling to sponsor IT and teaching assistants in classrooms, as became the norm across the Ivy League, as pioneered by Harvard using the high quality film studio format.

Other complications of the pandemic included the student side of learning. Students did not all have the resources, equipment, and technology to effectively learn remotely or at home, without additional support. Students living and learning independently from family on campus created several difficulties as well. Students over the past semesters favored in person learning as a more meaningful and effective. Acknowledging that students need to learn on campus, without the appurtenances of a physical presence, colleges recognized the necessity to provide the school spirit, community, and sense of belonging into virtual teaching. Anderson (2020) indicates effective digital pedagogy is critical and should not be considered a luxury. In addition, digital pedagogy is not only the means to deliver education, but more importantly is about the learning process and developing relationships. Students and educators could learn new technological skills that proved relevant and applicable.

An advantage presented to higher education instructors and professors forced to teach virtually during COVID-19 is the opportunity to revise and enhance their curriculum. Rethinking desired outcomes in the classroom during a challenging situation such as COVID-19, includes modifying course content, classroom activities, and reassessing courses. Revisions may include embedding the contemporary issue at hand and the COVID-19 pandemic into course curriculum (Hughes et al., 2020). Another advantage includes the implementation of technology into virtual learning, students and instructors being required to increase proficiencies in technology, including software and hardware competencies. In fact, the advent of technologies in management education settings and traditional environments aids learning.

Although higher education research primarily proposes a blended learning environment (Müller and Wulf, 2020) the shift in teaching virtually also provided educators the opportunity to revisit and revise curriculum. One way this may be accomplished virtually is by utilizing open education research (OER). Through OER educators can create materials that are personalized to students' learning, personalized to a Finance course, and which fosters greater accessibility to all students (Katz and Van Allen, 2020). As educators are likely to adjust syllabi and curricula to accommodate effective online learning, implementing OER can make learning more contemporary, relevant to the business world, through more easily adjusting to current events and information. Access is simplified online, if online access is being utilized exclusively in the classroom.

Some educators have been highly successful in moving from in person to virtual learning. Regarding the educator, professor, or instructor, Bruggeman et al., (2020) indicate there are instructor attributes, which are crucial to implement blended/virtual learning. They are as follows: 1. Teaching and education at the center. 2. Student-centered pedagogical beliefs, 3. Realizing a need for change. 4. Daring to experiment (and fail). 5. Daring to speak out - sharing needs and concerns. 6. Being able to critically self-reflect as a teacher. 7. Connecting technology to the learning process. In addition, McMullen et al., (2020) point out a few instructor attributes responsible for hindering effective virtual learning. These are: 1. Instructors prioritizing other tasks over teaching. 2. The teacher, not students, being at the epicenter. 3. Blended or blurred learning: In need of clear understanding. 4. Instructors feeling anxious towards technology. Whilst transitioning to virtual learning, higher education professors and instructors indeed experienced much higher workloads and stress than in face-to-face classes. In addition, they learned the need for adaptability and good planning. To accommodate student-learning

outcomes, instructors' resorted to the need to follow teaching methodology and modes containing a 'whatever it takes' approach to effectively teach.

The reality of recent findings indicates that there is much more learning taking place in the classroom than virtual learning alone provides. According to Marek *et al.*, 2021, institutions "should not lose sight of the wealth of experiences that students acquire from higher education that are beyond the scope of the actual classes". In fact, it is recognized that many students are not engaged at times with virtual learning. Students miss the in-person unscripted interactions of a classroom, classroom conversations, and the social situation surrounding being on campus: the in-person interaction represents personal growth and development experiences, irreplaceable in online settings. Elumalai, et al., (2020) assess the quality of e-learning in higher education from the students' perspective. Students usually do not receive significant instruction in virtual teams in a college or higher education setting. One advantage to the virtual learning transition created by COVID-19 is the newfound ability to effectively prepare business students for the contemporary world of work.

The increasing globalization of markets requires business educators to prepare students for a modern world. Demand exists for a skilled workforce that is prepared to work in a digital global economy through virtual teams. Currently many students do not have the skills to work in virtual settings early on in their careers. Teaching involving virtual teams thus provides students hands-on learning experiences vital in the present-day workforce. Furthermore, to adequately prepare students to succeed in the business world, higher education professionals may provide undergraduate business students with the opportunity, through learning online, to practice working in virtual teams. Students are also required to practice virtual leadership skills, team skills, organization, technology management and communication in an authentic setting. Lundstrum (2020) provides an accessible alternative for on-campus students and distance-learning students who do not need to have the flexibility to travel to the site of a business partner to experience the work place. These indispensable skills are clearly preparing students to take on roles of virtual leadership and team skills early on in their careers following graduation. Loucks and Ozogul (2020) provide suggestions and encourage higher education instructors to successfully teach real-world workplace skills through five key findings: 1. Organizing students through agendas, checklists and rubrics on running a successful virtual meeting. 2. Establishing communication guidelines to overcome communications challenges. 3. Motivating students to manage mixed student perceptions of virtual learning. 4. Providing students coaching and assessment for online courses. 5. Providing virtual technological training.

Another impactful teaching method in higher education takes place through the implementation of meaningful writing assignments. Business students will hone indispensable skills through effective, professional writing. Writing assignments not only promote conceptual learning, and a deeper understanding of course content, but provide student engagement and participation as well. Writing assignments are allocated and implemented with flexibility to the student schedule and reduce the possibility of dishonesty and plagiarism in the class and course. Students can be encouraged to use a college-writing center resources to further enhance collaboration, socialization, and improve writing skills, necessary for highly effective business communication upon graduation. Furthermore, rigorous classroom teaching through writing assignments can provide students powerful, engaging learning through promoting writing competences, giving and receiving feedback, and reflection, followed up with student revisions (Reynolds et al., 2020). Students admit to higher levels of cheating in online classes than in-person classes that can provide declining knowledge and learning at colleges and universities (Goff et al., 2020). Rigorous writing assignments in online teaching can reduce the tendency for students to disregard honesty and integrity in their online learning.

Not only are colleges and universities globally experiencing massive institutional shifts in operations, but businesses are as well. Undoubtedly, it must be acknowledged that the business world has moved appreciably due to the changes surrounding COVID-19. As business educators, there is an obligation to recognize these challenges and modify business education with content to prepare students post-graduation. Some business changes readily seen are in small and medium sized firms amongst whom many have few cash reserves and risk bankruptcy. Some industries such as retail, airline, hospitality, entertainment, and sporting events have been affected by immediate collapses in revenue. Students preparing for careers in associated industries may find a sea change in openings and opportunities, leading to reduced jobs in the marketplace and uncertain future career prospects. Yet firms such as logistics operators such as Amazon, online service providers including Zoom, home exercise services including Peloton, and home delivery services such as Uber Eats, DoorDash and Grubhub are thriving at unprecedented levels. Students may be forced to change their career pathways abruptly as business schools are driven to meet the changing demands of the business world and adjust learning accordingly (Kridhnamurthy, 2020). Markovits and Douglas (2020) note that practical flexible new models are needed, and as educators of finance, it is incumbent upon us to remain flexible and resilient whilst remaining true to time honored principles.

Learning Matters

Learning matters requiring attention and support surrounding effective student virtual learning, include student internet issues (access, affordability, broad bandwidth). Other obstacles include power supply instability, students without equipment

or with ineffective equipment. In some situations, students at home lack a quiet space, or space without constant interruption of family members. Many students simply prefer and benefit from face-to-face interactions and teaching (Sangster et al., 2020). Other issues and concerns surrounding online learning are listed in Table 1 below:

Table 1: Issues Surrounding Virtual Learning.

1.	Assessment changed to suit an online environment
2.	Stress – faculty
3.	Faculty workloads significantly increased
4.	Blended including face-to-face will be the new 'normal'
5.	Stress – students
6.	Internet access issues
7.	Students less engaged
8.	Proctoring concerns
9.	Faculty had to learn new skills quickly
10.	Students with no computers, tablets, or smartphones
11.	Students not connecting their cameras
12.	Broadband overload issues
13.	Changes of assessment constrained/delayed by accreditation concerns
14.	Students want face-to-face
15.	Faculty feeling isolated (no student body language/feedback in synchronous classes)
16.	Students quiet online
17.	Bureaucracy/Red tape
18.	Lost revenue streams (resulting risks)
19.	Students liked the flexibility of online

The biggest problem or issue surrounding virtual learning includes stress. Stress was expressed by both students and faculty regarding online learning. Stress relative to extra workload, feeling overwhelmed and burnout (Sangster et al., 2020).

Table 2: Factors That Negatively Impact Student Engagement.

1.	Stress – students
2.	Internet access issues
3.	Students with no computers
4.	Students not connecting their cameras
5.	Broadband overload issues
6.	Students want face-to-face
7.	Students quiet online
8.	Students muted their audio
9.	Online attendance lower than face-to-face
10.	Power cuts
11.	Student workload increased
12.	Increased training needed for students in online -v- face-to-face
13.	Students attending classes with people beside them talking at the same time as the tutor
14.	Students could not attend online classes because the family was all together
15.	Students struggled to cope with the switch to online

One of the biggest challenges of teaching under COVID-19 is a generational challenge. As faculty members every few years it is incumbent to be dealing with different generations based on the Pew Research categorization. The latest generation that most faculty members across the country face is the generation known as 'Gen-Z'. This generation born since 1997 has many distinctions that make it different from the previous generation of Millennials. They have grown up in a world where technology is omnipresent and a part of their daily lives throughout their education and in their private lives. They are often quite familiar with operating computers and other technology. Many of them grew up using iPads at school and are very

active on their phones and social media. They communicate rapidly with their peers and expect rapid responses from those who they reach out to. They expect rapid turnaround times on emails, and they expect immediate responses. They are transactionally oriented and have been raised in an era where LMS platforms are ubiquitous and are widely used for syllabi, grading and course material. They expect these platforms to be straightforward, easy to use and have their grades available so that they are aware at any point in time exactly where they stand. They are less concerned about careers and more concerned about income. From a teaching standpoint they have a very definite idea of what they expect in terms of grading and outcomes. They are not comfortable with gray areas and are more comfortable with clear guidelines that they can execute against.

This will ultimately play out in the workforce where many prospective employers will raise issues about adaptability amongst the new generation. As professors, it remains essential to come up with effective ways to challenge the students while helping them understand the material necessary for them to be successful in the course, and in their future careers beyond their time in the classroom. While this may appear somewhat simplistic, it is useful to discuss recommended tools for educators using both active and passive methods of teaching alongside breaking out the types of courses taught during the pandemic into three distinct categories of classroom / lecture halls, hybrid courses and online courses.

Figure 1: A Solid Fun Method.

	Classroom/Lecture Hall	Hybrid	Online
Active Methods	Quizlet Kahoot Cases Jeopardy Breakout groups (*in Person*)	Quizlet Kahoot Cases Online Guest Speakers Jeopardy Breakout groups (*In Person/Online*)	Quizlet Kahoot Cases Online Guest Speakers Breakout groups (*Online*) VR
Passive Methods	Problem Assignments Movies or Video Clips CMS Lectures Problem Sets	Problem Assignments Recorded Lectures Movies or Video Clips CMS Lectures Problem sets	Problem assignments Recorded Lectures Movies or video clips CMS Problem sets

Active Teaching Methods

A solid fun method of developing interactive ways of quizzing and gaming within a class is easily satisfied by Kahoot or Quizlet. Both are free web-based platforms with thousands of questions on a range of different topics and with an easy ability to generate instructor-specific questions and content. These can be put together into simple fun question competitions that take advantage of the competitive nature of the Gen-Z students. The free version available online will meet the needs of most faculty. However, should a faculty member wish to do more complex types of questions or different types of modes of challenging students, a subscription would be involved. Both of these techniques fall into active learning methods which fit all three frames of teaching modalities: in class, hybrid and online modalities. Other types of games such as Jeopardy become a lot more difficult in an online modality, as teams you might create for the purpose of Jeopardy would be much more difficult to carry off online. Live in-class groups may be a little more effective with a game such as Jeopardy.

Questions can be created to address simple topics such as time value of money, or concepts like different types of interest premia. Problems can be created where a list of answers can be chosen from a multiple-choice fashion, such as calculate the present value, or calculate the valuation of an equity using the dividend discount model. Then the students would choose from a list of potential options. More involved versions of this can be done but usually these versions fall behind the pay walls of the various software. There are Jeopardy templates available, which allow faculty members to create questions and categories and set time limits on how long students have to respond to the questions. Cases have been a standby for many decades and remain an effective way of challenging students to think about finance problems in deeper ways.

Cases are usually in the form of an in-class discussion in which students contribute their ideas and methods of solving specific problems. One of the drawbacks of the case method is that it focuses on students responding one at a time or a team

at a time. While one might assume that all students will remain engaged throughout the discussion of the case, it is not clear whether they remain involved in an online modality where they may turn off their cameras yet remain engaged. In addition, cold calling online students may be an easier approach to online students to ensure that they are actively involved participating in the case. There is a wide variety of case libraries available that cover finance-related topics, connected to both textbooks and learning management systems, as well as online services such as Thunderbird, Harvard Business School ePublishing or other available online case libraries. One of the opportunities with hybrid or online teaching is to invite virtual guest speakers. Live guest speakers are a way to convey important topics and relevant current information to students studying a specific issue. In a personal finance course, it would be easy to bring in successful financial advisors, CFAs, personal bankers or other finance experts to give the students a better understanding of the demands that would be placed on them in the world beyond university.

The advantage of online speakers is that they can be anywhere in the world and provided they are willing to attend during course hours; it will make for an exciting interactive experience for the students. For example, it might be possible to bring in bankers from the Middle East online to talk about the impact of Sharia law on Islamic banking practices in that region, or London-based financial experts to discuss how they arrive at LIBOR numbers on any given day. The students could engage with questions online with these guest speakers, since engagement enhances the students' experience and understanding of the topics that are being discussed by the guest speaker. Lowenthal, et al., (2020) note that this does not preclude live in-class courses from using online guest speakers, but there might be a different feel to a course where the guest speaker is on camera and students would have a more difficult time interacting with them, perhaps only one at a time and they might not have a chance to ask questions that concern them directly, due to time constraints. It is possible to create a hybrid situation in the classroom, where the in-class students could potentially connect for the purposes of chat functions, though concomitantly this risks students potentially using their phones in class for other less desirable purposes which might obviate the potential benefits.

Breakout groups are yet another active strategy for students to work together to solve finance-related problems more effectively. A professor in a live setting would organize students into smaller groups to work together on a topic and solve a problem, walking between groups to gauge how the students are doing with the problem and address any confusion or difficulties on the spot. This is a very effective way of getting a good sense of how students are doing with technical material. In a hybrid environment, this is much more complicated as in-class students would lend themselves to professors walking up to their group to discuss questions that they might have. However, it is a much more difficult balancing act to deal with online students in breakout rooms simultaneously. Whilst not impossible, it would require the professor to spend their time ensconced in front of their computers chatting with various breakout groups, and then moving around classrooms or lecture theaters to address in-class breakout groups as well. An online modality seems to work better, as it is easy for professors to switch between groups using platforms such as WebEx.

Another technique, although still in its infancy is virtual reality (VR). Some courses have created VR-based learning approaches, but the challenge becomes having students being in possession of the required equipment to interact with this material effectively. It would be conceivable that professors could develop interesting techniques that would be different from the way the topics are currently taught. For example, pushing gold through a building that might represent the Federal Reserve in New York for example, which would cause dollars to flow out of the other side of it. While this is not a very accurate representation, it does make for a more visual display of the process actually backing a currency and making international payments. Another approach would be to take interest rates and quantities of money and drop them on a financial calculator, which would then show you a layout of funds that might flow from any such a transaction. At present, the cost of VR headsets has been falling rapidly. Yet, the availability of suitable software or courseware is still in its infancy and would depend heavily on the development of publishers or faculty as a way of generating the required specific course materials.

Passive Teaching Methods

Passive teaching methods work, as much of the work is required to be done outside of class, rather than inside of class. Problem sets are an integral part of many finance courses as they challenge students to work through the theoretical material, which can be utilized in a practical manner to solve various finance issues. These problems are often used in conjunction with learning management systems or textbooks, which make many of these problems available to students along with solutions. This allows professors to put much of that work level offline, and help focus students on the most challenging parts, which they might find difficult solving on their own. Video clips such as those available on Investopedia, or movies such as "The Big Short" or "Wall Street" can be delivered live, but they are perhaps not the most effective use of class time as students may be able to watch them offline at their leisure. The advantage of students watching these films or clips offline passively, is that in class discussions will have more time to address the key issues they raise. There is also the opportunity to create questions around that material which students can also address offline.

Once again, this puts the burden of learning and understanding on the student, especially as the current Gen-Z group prefers explanation and exposition, over the more traditional emphasis on self-discovery. Lectures or recorded lectures are more common in large institutional settings. When dealing with classes that have upwards of 50 or 60 students, and in some cases over several hundred students, it becomes less feasible or practical to have more discussion-oriented courses, as relatively few participants would be able to discuss, leaving most students passively observing. Recorded lectures have become a common feature during COVID-19, as many of the online platforms such as WebEx or Zoom allow faculty members to record their lectures or discussions as they presented. Posting these lectures allows students to go back and review discussions in class: any topics that perhaps may have confused them during class time could make more sense under further investigation.

Content management systems have become the norm over the last fifteen years. Not only have university professors made content management systems such as Blackboard or Canvas the standard in which they deliver their courses, most middle schools and high schools now use similar platforms to deliver content to their students. As students in Gen-Z have been raised with these content management systems, they demand and expect that these systems will be used in a similar manner in their college courses. However, the range in which they are deployed at the university level can vary tremendously by professor. While some put basic content or syllabi up for students to download, others upload lots of material, both directly related and supplementary to the course. This variation in content on platforms creates confusion amongst Gen-Z students and may lead to less than positive responses on course evaluations (Uttl and Smibert, 2017). One of the features built into many of these online platforms is a calendar function or syllabus function that sets due dates for material that students can follow. Many Gen-Z students are familiar with those functions to determine assignments due on specific dates. It is not uncommon for students to ask what the due dates are, even though they may have been explicitly laid out in a PDF copy of the syllabus. This is because they are looking for what the electronic syllabus states rather than the hard copy, as their experience tells them that these are the most frequently up-to-date deadlines to utilize for assignments.

Figure 2: Engagement vs. Challenge Paradigm
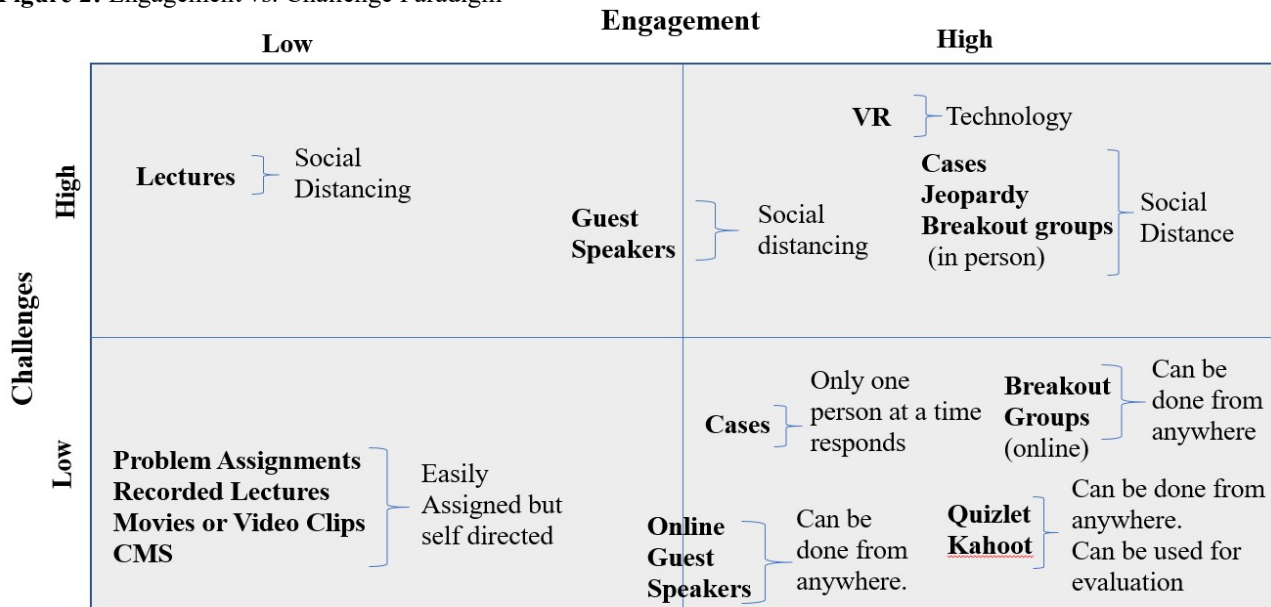
Engagement is the key success factor regarding courses and professor evaluations. Finance courses are quantitatively challenging, and for many students this challenge relies on their understanding of quantitative material that they must develop throughout their time enrolled in the course. Qualitative courses generally allow students to draw on previous knowledge or experience in courses and in the real world, more easily than quantitative courses. Studies have shown that qualitative courses get higher course evaluations on average than quantitative courses, perhaps for this reason. One method of pushing back on this phenomenon is engaging students more actively in their classwork. The following chart reorganizes many of the techniques discussed in terms of engagement, high versus low, and challenging for faculty to deliver high versus low. This looks at a spectrum of techniques discussed in terms of some of the challenges they might present during COVID-19 versus the engagement that students might derive from these techniques.

High Challenge/High Engagement

These techniques are largely driven by social distancing requirements during COVID-19. Many institutions' guidelines suggest students must keep six feet distance between each other. Some of the challenges include guest speakers, Jeopardy and breakout groups. They are high engagement activities as they allow students a more active approach to their learning. However, striking the right balance can be delicate: for example, students and breakout groups in a classroom must be close enough to have a discussion, yet far enough away to observe mandated social distancing guidelines. Those requirements also put limits on the number of physical attendees at any guest lectures. One other group placed in this category was virtual reality, largely because it represents challenges that have not yet been solved, such as availability of course content. Should that challenge be met, it may become more of a game changer in the educational sphere as many of the social distancing issues may be mitigated.

Low Challenge/Low Engagement

This represents a large group of techniques that are used in classroom settings but was not a high challenge for faculty members to deliver and may also lead to low engagement on behalf of the students. Techniques such as movies, video clips, problem sets or recorded lectures are easily assigned and self-directed but may not be as engaging as some of the active techniques discussed earlier. High engagement/low challenge represents the optimum combination for faculty members as those techniques are easily implemented and engage students' participation directly. Gamified systems such as Quizlet and Kahoot make it easy to create an interactive, fun question-and-answer in a competition that can engage all students simultaneously. The questions can range from simple to much more complex with the ability to adjust timing accordingly. Other functions are also available, though usually behind a pay wall. Cases also fall into this category as they usually engage students well even though only one student at a time may respond. They represent a lower challenge for faculty members as there is usually a resource attached to the case to make it easier for faculty members to prepare. Another effective engaging technique might be online guest speakers where students have a chat function and ask questions that the speakers can answer.

High Challenge/Low Engagement

That combination is perhaps less effective during COVID-19 as it might require a lot of preparation with lower impact on student learning. Lectures might fall into the category of high challenge and low engagement. This may be because of social distancing guidelines that will force classes to be more physically spread out. The challenges may come from the layout of the class and ultimately the hybrid nature, due to more students having to be outside of class rather than inside it. However, many students would regularly identify live in-class experience as their far preferred modality for learning. Those lectures may really fit into the category of moderate engagement, as students would prefer them to a purely online lecture experience.

Figure 3: Engagement vs. Class Size Paradigm
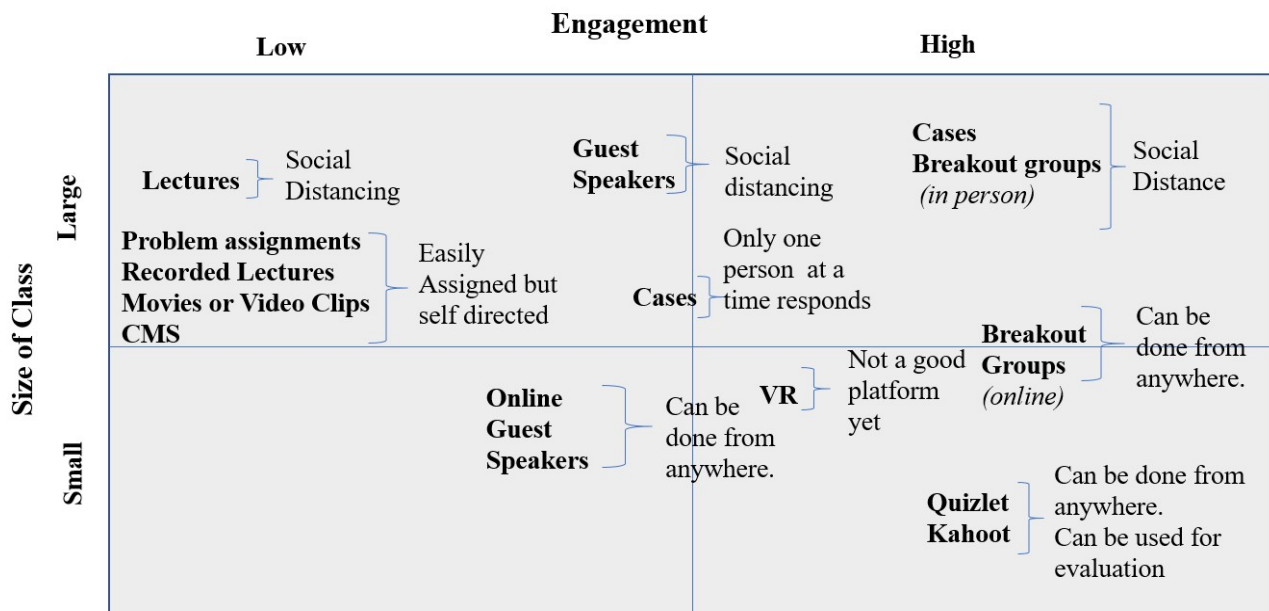
Size of Class

It is also a concern for many institutions due to budgetary and financial concerns that class sizes have been swelling over the last decade. This limits options available to faculty members in terms of modalities that they may use in their existing classes. Using the techniques discussed, Figure 3 above attempts to break these modalities up into class-size versus engagement as a way of perhaps identifying the techniques that may be more effective based on the size of class that a faculty member is currently facing. Large classes are much more common amongst big universities and large private institutions. These institutions are set up for learning environments that deal with large number of students simultaneously. Lectures are much more common in large institutions as there is less opportunity for direct engagement between faculty members and their large class sizes. Many of these classes use techniques such as problem assignments, recorded lectures, movies or video clips and content management systems. They may also employ guest speakers, cases, and breakout groups if COVID-19 social distancing guidelines are followed. Smaller classes open opportunities for faculty to use more engaging strategies, as it is easier for a faculty member to engage more directly with individuals in smaller class sizes. Many gamified techniques such as Jeopardy or Kahoot are easier to employ in a smaller course setting. Several other techniques such as guest speakers and breakout groups may also work better in a smaller class environment. Students may have the opportunity to interface with the guest speakers, providing a better in-class experience for them. Breakout groups may also be more effective in smaller class settings as it may be easier to meet COVID-19 social distancing requirements.

Conclusions

The list of techniques considered here is by no means an exhaustive list of all tools available in the arsenal of finance professors. New techniques are consistently developed and honed over time. Larger companies like Google have developed techniques like jam board that is a fun way to organize student participation on a question through sticky notes shown on a digital screen. However, techniques like these are limited to a smaller number of participants and do not readily lend themselves to larger class sizes yet. For each faculty member, the challenge is to figure out what techniques work best for them given the types of courses they are teaching and the challenge of the material that they are hoping to elucidate. It is anticipated that the COVID-19 pandemic will be neutralized over time thanks to the development and roll out of effective vaccines. However, it is uncertain how soon the next pandemic may occur and the teaching modalities developed under the present circumstances may prove to be extremely useful, should another pandemic render moot the ability to hold to more traditional approaches to teaching finance in the classroom.

References

Anderson V (2020) A digital pedagogy pivot: re-thinking higher education practice from an HRD perspective. Human Resource Development International 23(4):452-467. http://dx.doi.org.ezproxy.rollins.edu:2048/10.1080/13678868.2020.1778999

Boyer-Davis S (2020) Technostress in higher education: an examination of faculty perceptions before and during the covid-19 pandemic. Journal of Business and Accounting 13(1):42–58.

Bruggeman B, Tondeur J, Struyven K, Pynoo B, Garone A, Vanslambrouck S (2021) Experts speaking: crucial teacher attributes for implementing blended learning in higher education. The Internet and Higher Education 48:100772. https://doi.org/10.1016/j.iheduc.2020.100772

Elumalai KV, Sankar JP, Kalaichelvi R, John JA, Menon N, Alqahtani MSM, Abumelha MA (2020) Factors affecting the quality of e-learning during the COVID-19 pandemic from the perspective of higher education students." Journal of Information Technology Education Research 19:731–753. https://doi.org/10.28945/4628.

Goff D, Johnston J, Bouboulis BS (2020) Maintaining academic standards and integrity in online business courses. International Journal of Higher Education 9(2):248–257.

Hughes MC, Henry BW, Kushnick MR (2020) Teaching during the pandemic? an opportunity to enhance curriculum. Pedagogy in Health Promotion 6(4):235–238. https://doi.org/10.1177/2373379920950179

Katz S, Van Allen J (2020) Teaching with OER during pandemics and beyond. Journal for Multicultural Education 14(3):209-218. http://dx.doi.org.ezproxy.rollins.edu:2048/10.1108/JME-04-2020-0027

Krishnamurthy S (2020) The future of business education: a commentary in the shadow of the Covid-19 pandemic. Journal of Business Research 117:1–5. https://doi.org/10.1016/j.jbusres.2020.05.034

Loucks S, Ozogul G (2020) Preparing business students for a distributed workforce and global business environment: gaining virtual leadership skills in an authentic context. TechTrends 64(4):655-665. https://doi.org/10.1007/s11528-020-00513-4

Lowenthal P, Borup J, West R, Archambault L (2020) Thinking beyond zoom: using asynchronous video to maintain connection and engagement during the COVID-19 pandemic. Journal of Technology and Teacher Education 28(2):383-391. https://www.learntechlib.org/primary/p/216192/

Lundstrum LL (2020) Teaching international business development using current business metrics." *Journal of International Education in Business*, 13(2), 263–274. https://doi.org/10.1108/JIEB-08-2019-0037

Marek MW, Chew CS, Wu WV (2021) Teacher experiences in converting classes to distance learning in the COVID-19 pandemic. International Journal of Distance Education Technologies 19(1):89-109 https://doi.org/10.4018/IJDET.20210101.oa3

Markovits E, Douglas A (2020) Pandemic Innovation. New England Board of Higher Education. https://nebhe.org/journal/pandemic-innovation/

McMullen A, Bursuc V, Doval C, Grant S, Grossberg J, Jones I, Willey S (2020) Strategies for Effective Online Teaching in Higher Education. Social Science Research Network ID 3745959). https://doi.org/10.2139/ssrn.3745959.

Müller FA, Wulf T (2020) Technology-supported management education: A systematic review of antecedents of learning effectiveness. International Journal of Educational Technology in Higher Education, 17(1) http://dx.doi.org.ezproxy.rollins.edu:2048/10.1186/s41239-020-00226-x

Reynolds JA, Cai V, Choi J, Faller S, Hu M, Kozhumam A, Schwartzman J, Vohra A (2020) Teaching during a pandemic: using high-impact writing assignments to balance rigor, engagement, flexibility, and workload. Ecology and Evolution, 10(22):12573–12580. https://doi.org/10.1002/ece3.6776

Sangster A, Stoner G, Flood B (2020) Insights into accounting education in a COVID-19 world. Accounting Education, 29(5):431–562. https://doi.org/10.1080/09639284.2020.1808487

Uttl B, Smibert D (2017) Student evaluations of teaching: teaching quantitative courses can be hazardous to one's career. PeerJ 5:e3299 https://doi.org/10.7717/peerj.3299

Valuing Equity Using the Black-Scholes Model
R. Stafford Johnson, Xavier University

Abstract

In this paper, the valuation of equity as a call option is examined, and a price-earnings multiplier model is derived in terms of the parameters defining the Black-Scholes option pricing model. The valuation of equity as a call option is then examined empirically by using accounting data to estimate the equity values and price-earnings ratios of 79 stocks from the S&P 100 using the Black-Scholes model.

Equity as an Option

The limited liability feature of common stock enables the stockholders of a leveraged corporation to view their equity position as a call option on the assets of the corporation, with the corporation's creditors being viewed as the writers of the call option and the owners of the firm. That is, a company's stock in effect gives its shareholders the right to buy the firm from the company's creditors at an exercise price equal to the face value on the debt. If the company is successful, causing the value of the firm's assets to grow, then the shareholders will exercise their equity right and effectively buy back the company from the creditors at the exercise price equal to the debt's face value. If the value of the firm is less than the debt's face value, then the shareholders will choose not to exercise their option to reclaim the firm from the bondholders.

To illustrate, suppose a company has debt consisting only of a zero-discount bond with a face value of F and maturing at time T. The shareholders of the company can view their equity position as a call option in which they can buy the company from the bondholders at an exercise price equal to the face value of the debt, with an expiration date equal to the bond's maturity. As shown in Exhibit 1, if the value of the assets' of the firm (V^A) exceeds F at maturity, $V^A_T > F$, the shareholders of the company would exercise their option and purchase the company from the bondholders at the exercise price of F. If $V^A_T < F$ at maturity, then the shareholders would not (or could not) exercise. Thus, at expiration the total value of equity of the company (V^E_T) would be:

$$V^E_T = \text{Max}[V^A_T - F, 0]$$

The bondholders' position can be viewed as a covered call write position in which they (1) own the assets of the firm and (2) have a short position on a call option on the firm's assets. As shown in Exhibit 2, at expiration if $V^A_T < F$, the call (or equity) position is worthless, and the bondholders retain their ownership of the company. If $V^A_T \geq F$, however, then the shareholders will buy the company from the bondholders at the exercise price of F. In this case the value of the bond (V^B_T) is equal to F. Thus, the value of the bondholders' position at maturity is equal to the minimum of either F or V^A_T:

$$V^B_T = \text{Min}[V^A_T, F]$$

This minimum condition can be stated equivalently in terms of the following maximum condition:

$$V^B_T = V^A_T - \text{Max}[V^A_T - F, 0]$$

That is:

	$\text{Min}[V^A_T, F]$	$V^A_T - \text{Max}[V^A_T - F, 0]$
If $V^A_T \geq F$	F	$V^A_T - [V^A_T - F] = F$
If $V^A_T < F$	V^A_T	$V^A_T - 0 = V^A_T$

The equation shows the expiration value of the debt is equal to the value of the firm minus the intrinsic value of the call, which is equal to the expiration value of a covered call write position.

Prior to maturity, the value of the stock (V^E_t) would be equal to its intrinsic value plus a time value premium, and the value of the debt would be equal to the value of the firm minus the equity value. Exhibit 3 shows the values of equity and

debt as functions of the value of the firm. In the figure, the IV line depicts the intrinsic value of the equity, the 45-degree line shows the maximum equity value, the curve in between shows the call price curve, representing the value of the equity, and the vertical distance between the 45-degree line (V^A_t) and the equity curve (V^E_t) shows the value of the debt.

Figure 1: Equity value at maturity
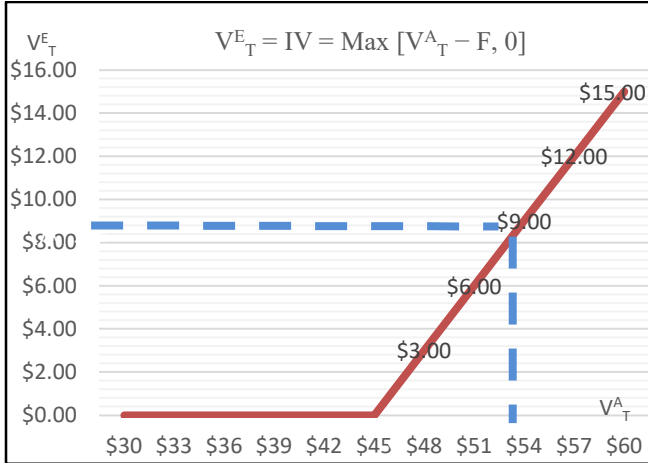
Figure 3: Equity and debt values prior to maturity
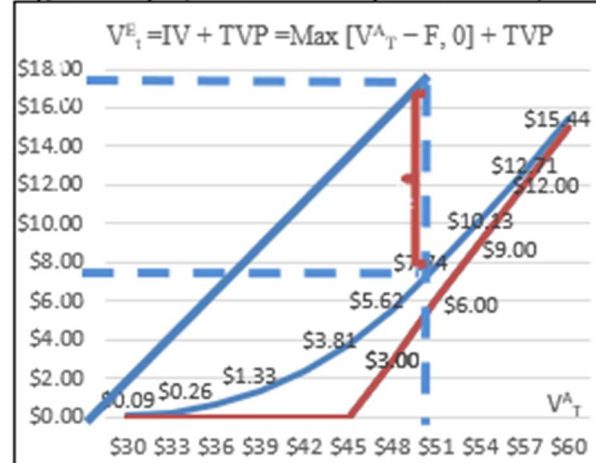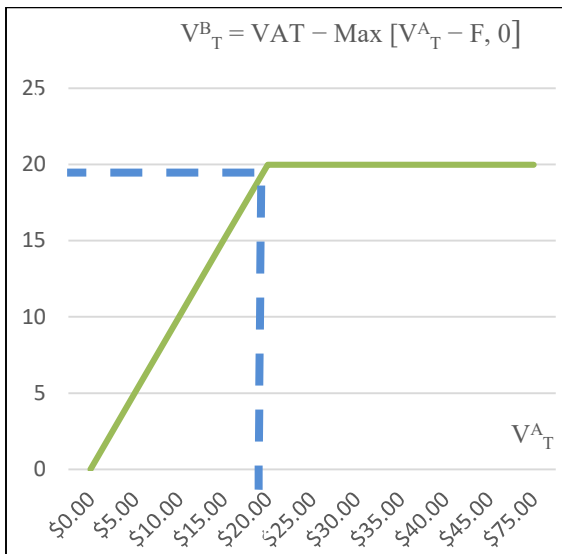

Figure 2: Debt value at maturity

Valuing equity as a Call Option

The current value of equity can be estimated using the Black-Scholes Option Pricing Model (OPM) (Black and Scholes, 1973). Specifically:

$$V^E_0 = V^A_0 \, N(d_1) \left[\frac{F}{e^{RT}}\right] N(d_2)$$

$$d_1 = \frac{\ln(V^A_0/F) + (R + 0.5 \, \sigma^2)t}{\sigma\sqrt{t}}$$

$$d_2 = d_1 - \sigma \sqrt{t}$$

As an example, suppose the ABC Company currently is worth $15 million, has a debt obligation consisting of a zero-coupon bond maturing in two years with a face value of $10 million, and has an asset variability of σ = 0.5. If the annual risk-free rate is 6%, the value of ABC stock, using the B-S OPM, would be $7,170,113 and the value of its debt would be $7,829,887:

$$d_1 = \frac{\ln(\$15,000,000/\$10,000,000) + [0.06 + 0.5(0.5^2)](2)}{0.5\sqrt{2}} = 1.09667$$

$$d_2 = 1.09667 - 0.5\sqrt{2} = 0.38957$$

$$N(1.09667) = 0.86338$$

$$N(0.38957) = 0.65175$$

$$V_0^E = (\$15,000,000)(0.86338) - \left[\frac{\$10,000,000}{e^{(0.06)(2)}}\right](0.65175) = \$7,170,113$$

$$V_0^B = V_0^A - V_0^E = \$15,000,000 - \$7,170,111 = \$7,829,887$$

Note that as an option, the value of the stock is an increasing function of the firm's value, the maturity of its debt, and variability of the firm's assets, and a decreasing function of the principal on the firm's debt:

$$V_{E_t} = f(\underset{+}{V_{A_t}}, \underset{-}{F}, \underset{+}{T}, \underset{+}{\sigma})$$

The relations are illustrated in Exhibit 4. The exhibit shows combinations of the B-S OPM equity values and asset values for different parameter values. The first column shows the equity values given the parameter values used in the preceding example: X = $10,000,000, T = 2 years, R = 0.06, and σ = 0.50. The other columns show the equity and asset values relations generated with the same parameter values used in Column 1, except for one variable: in Column 2, σ = 0.75, T = 5 years in Column 3, X = $12,000,000 in Column 4, and R = 0.08 in column 5. Over the range of asset values, the BS OPM yields a positive, convex equity and asset value relation. The relationship is shown in the figure in Exhibit 4 where the B-S equity values and asset values from column 1 are plotted. The slope is the option's delta and is equal to $N(d_1)$ in the B-S model. Comparing Columns 1 and 2 also shows the direct relation between volatility and equity values.

Exhibit 4: Equity value relations

	1	2	3	4	5
	F = $10,000,000	F = $10,000,000	F = $10,000,000	F = $12,000,000	F = $10,000,000
	T = 2 Years	T = 2 Years	T = 5 Years	T = 2 Years	T = 2 Years
	σ = .5	σ = 0.75	σ = .5	σ = .5	σ = .5
	R = 0.06	R = 0.06	R = 0.06	R = 0.06	R = 0.08
Value of Asset	Value of Equity	Value of Equity	Value of Equity	Value of Equity	Value of Equity
$15,000,000	$7,170,113	$8,396,644	$9,326,718	$6,109,940	$7,400,259
$16,000,000	$8,043,342	$9,253,205	$10,215,777	$6,918,888	$8,285,666
$17,000,000	$8,935,230	$10,121,859	$11,114,734	$7,751,029	$9,188,325
$18,000,000	$9,842,662	$11,001,202	$12,022,645	$8,604,135	$10,105,200
$19,000,000	$10,762,986	$11,890,458	$12,938,596	$9,475,701	$11,033,777
$20,000,000	$11,694,012	$12,788,795	$13,861,736	$10,363,275	$11,972,016

Comparing Columns 1 and 2 in Exhibit 4 shows the direct relation between volatility and equity values. The direct relation between the value of equity and variability reflects the limited liability characteristic of equity in which equity provides an unlimited profit potential and limited loss. Given the direct relationship between equity value and variability, the stock of a leveraged company should be valued greater than an otherwise identical leveraged company if its assets are riskier. It also follows that if the objective of the company's managers is to maximize the wealth of its shareholders, then with other factors constant, managers in selecting amongst mutually exclusive investment projects should select the riskier one. If the market, in turn, values stock as a call option, then managers can augment the equity values of their company by selecting riskier investments (and finding creditors to help finance them).

Empirical Findings

The idea that equity can be modeled as a call option has been recognized since the development of the BS OPM itself. In 1999 study, Russel and Branch (1999, pp. 55-75) examined empirically whether the "high" stock prices of bankrupt firms were evidence of an anomaly or whether the BS OPM can be used to explain these prices. They, in turn, found that bankrupt firm stock prices are realistic for some estimated levels of the BS OPM parameters and thus not necessarily priced too high. There are several limitations to Russel and Branch's study. First, Corrado and Su (1997) provide evidence that BS OPM misprices deep out-of-the-money options and bankrupt firms would be considered deep out-of-the-money options. Further, bankrupt firms do not pay dividends and it is unclear to what extent their results are generalizable to a broader sample of dividend paying stocks of firms that are not in financial distress.

As a first test to determine what extent the BS OPM explained the equity values, stock data on the S&P 100 firms from Compustat was used to estimate the BS model equity values for a larger sample of stocks than Russel and Branch. From the 100 stocks, firms that did not have long-term debt or debt due in one year were excluded, leaving 79 observations. The inputted data for Black-Scholes model variables included:

- Asset value (V_A) = assets minus current liabilities.
- Exercise price (F) = long-term debt.
- Time (T) = long-term debt divided by debt due in one year. If the calculated time was greater than 30, maturity was set equal to 30, which is the typical maximum maturity for a corporate bond.
- Volatility (σ) = the standard deviation of the return on assets over the previous 20 quarters.
- Earnings (e) = net income.
- Dividends (d) = dividend yield.
- Risk-free rate (R) = 2%.
- Data from the fourth quarter of 2018 was used

Table 1 shows the summary statistics for the variables used in the study.

Table 1. Univariate Statistics for 79 of the S&P 100 stocks that have both long-term debt and debt due in one year as variable

Variable	Mean	Standard Deviation
Assets	115,020	210,571
Long-term Debt	18,553	33,769
Time	9.89	10.35
Standard Deviation – ROA	0.033	0.049
Using prior 20 quarters		

Table 2. Regression with market value as the dependent variable; 79 observations

Variable	Coefficient	t-statistic	p-value
Intercept	11,873	2.40	0.0187
Black-Scholes	2.7869	14.65	<0.0001
Estimate Call Value			
Adjusted R^2	0.73		

The data for these variables were, in turn, inputted into the dividend-adjusted BS model to estimate each stock's value. Since this is accounting data and historical, the estimated Black-Scholes value were expected to be less than the actual market value. For this reason, the estimated Black-Scholes values were regressed against the actual market values of the firm. As shown in Table 2, the Black-Scholes coefficient were, in turn, found to be highly significant in explaining the market value of a firm, with the adjusted R^2 of 0.73 indicating that this relationship explains a significant portion of the market value of equity.

Estimating the Multiplier Using the B-S OPM

A common approach among analysts in valuing stocks is to use the multiplier model. The multiplier approach involves valuing a stock by multiplying the stock's price-earnings ratio by the stock's forecasted earnings per share for the next period.

$$V_t = \frac{P}{e} E(EPS_{t+1})$$

The EPS (e) for the P/e multiplier is the expected EPS for the next period (e.g., next 12 months) with EPS generally measure as an annualized EPS.

Analysts vary in how they estimate the equilibrium P/e ratios from P/e ratios based on the current year or period values, P/e's based on estimated EPS for next year, to P/e's calculated using moving averages for EPS. One approach for estimating the multiplier is to use the Gordon constant-growth model (1959, pp. 99-105): divide the model's value V (or price, P) by EPS (or e), and then input estimates of the model's three parameters: dividend/earnings (d/e), required return on equity (k_e), and the growth rate in its earnings (g):

$$V = P = \frac{d}{k_e - g}$$
$$\frac{V}{e} = \frac{P}{e} = \frac{d/e}{k_e - g}$$

Instead of a direct approach, some analysts use a cross-sectional regression model to estimate the multiplier. Cross-sectional models differ in terms of the explanatory variables used to explain P/e. In a 1979 study, Malkiel and Cragg (1970) used the Gordon model variable, regressing 150 stocks' P/e ratios against three variables: dividend earnings ratio, d/e, historical growth rates, g, and betas.

An alternative to the Gordon model would be to estimate the multiplier using the BS OPM as defined for the equity of a leveraged company:

$$\frac{P}{e} = \frac{V_{E_T}}{e} = \frac{V_{A_t}}{e} N(d_1) - \frac{F}{e} e^{-RT} N(d_2)$$
$$d_1 = \frac{\ln(V_{A_t}/F) + [R + 0.5\sigma^2]T}{\sigma\sqrt{T}}$$
$$d_2 = d_1 - \sigma\sqrt{T}$$

Estimating P/e with the BS model could be done either directly using the above equation, or by estimating P/e with a cross-sectional regression model defined by the B-S OPM variables defining P/e:

$$P/e = c_0 + c_1(V_{A_t}/e) + c_2(F/e) + c_3(V_{A_t}/F) + c_4(\sigma) + c_5(T) + c_6(R) + \varepsilon$$

Estimation

To test the impact that individual variables used in the BS model have on stock's P/e ratio, cross sectional regressions of the 79 stock's P/e ratios were run against their assets/earnings, long-term debt/earnings, volatility of the return on assets, time to maturity, and dividend yield. As shown in Table 3, the regression shows the Black-Sholes variables for underlying assets/earning, debt/earnings (strike price) and volatility (standard deviation of return on assets) were statistically significant in explaining the price-earnings ratio and consistent with the a priori expected signs. The time variable was not found to statistically significant in explaining the price-earnings ratio, while the dividend yield was found to be close to being statistically significant and its sign consistent with a priori expectations.

Table 3. Regression with price-earnings as the dependent variable; 79 observations

Variable	Coefficient	t-statistic	p-value
Intercept	25.41	4.97	<0.0001
Assets/Earnings	0.00000006	7.76	<0.0001
Long-Term Debt/Earnings	-0.00000006	-3.19	0.0021
Standard Deviation of ROA	95.15	2.03	0.046
Time	-0.07	-0.35	0.7308
Dividend Yield	-253.55	-1.6	0.1075
Adjusted R^2		0.48	

Summary and Conclusion

The limited liability feature of common stock enables the stockholders of a leveraged corporation to view their equity position as a call option on the assets of the corporation, with the corporation's creditors being viewed as the writers of the call option and the owners of the firm. In this paper, the valuation of equity as a call option was examined and, in turn, a price-earnings multiplier model was explained in terms of the parameters defining the Black-Scholes option pricing model. The valuation of equity as a call option was then empirically estimated by using accounting data, and the price-earnings ratios of 79 stocks from the S&P 100 was estimated using the Black-Scholes model. From this sample of stocks, the BS model was found to be significant in explaining the market value of the firm, and the variables used in the Black-Scholes model were found to have the expected signs and significant in explaining price-earnings ratios. Of particular note, the price-earnings ratios were found to be higher for firms with higher return on asset volatility.

References

Black F, Scholes M (1973) The pricing of options and corporate liabilities. Journal of Political Economy 81: 637-659

Corrado CJ, Su T (1997) Implied volatility skews and stock return skewness and kurtosis implied by stock option prices. The European Journal of Finance 3: 73-85.

Diltz JD, Kim S (1996) The relationship between stock and option price changes. Financial Review 31: 499-519

Eberhart AC (2004) Equity valuation using multiples. The Journal of Investing 13: 48-54

Gordon MJ (1959) Dividends, earnings, and stock prices. The Review of Economics and Statistics May: 99-105

Malkiel BG, Cragg JG (1970) Expectations and the structure of share prices. The American Economic Review 60: 601-617

Russel P, Branch B (1999) Market valuation of bankrupt firms: is there an anomaly? Quarterly Journal of Business and Economics, Spring: 55-75

Literature Review: Improving Farm Performance through Financial Literacy Education

Guohua Ma, Aleksander Stupar, Tyrone Brunson, and Jada Digg, South Carolina State University
Wei Wan, Claflin University

Abstract

Agribusiness development depends on individual farm's performance and growth. Among the factors that determine the farm's performance, financial literacy is a critical factor that governs the survival and growth of the farms. This study reviews relevant literature and propose a conceptual model that connects financial literacy education and farm performance. The authors expect that financial literacy education among farmers can greatly improve farm performance, create jobs, and ultimately enhance agribusiness development. They also anticipate that financial literacy education can benefit farmers and rural communities.

Introduction

Agribusiness plays an essential role in the economy. Agribusiness development depends on individual farm's performance and growth. Among the factors that determine the farm's performance, financial literacy is a critical factor that governs the survival and growth of the farms. Financial literacy is defined as the ability to use knowledge and skills to manage financial resources effectively (Organization for Economic Cooperation and Development 2011). Even though studies have shown that financial literacy significantly impacts the success and failure of businesses, scant attention has been paid to how financial literacy impacts the farm's performance in the agricultural context. A number of crucial questions, such as the farmers' current financial literacy level, the determinants for farmers' financial literacy and farm performance, and the transmission mechanism of financial literacy on the farm performance, remain unanswered.

This paper briefly reviews the literature related to financial literacy and farm performance and proposes a transmission mechanism that connects financial literacy education among farmers to farm performance. To understand the problem better, the authors discuss the relevant literature from several research streams, which include the literature on the definition of financial literacy, factors that affect financial literacy, farm performance, and the relationship between financial literacy and business performance.

Definition of Financial Literacy

The current literature defines financial literacy in two ways: the narrow way and the broad way. The narrow definition of financial literacy limits in the area of personal finance. Jump$tart Coalition for Personal Financial Literacy defines financial literacy as "Financial literacy is the ability to use knowledge and skills to manage financial resources effectively for a lifetime of financial well-being." Remund (2010) defines "Financial literacy is a measure of the degree to which one understands key financial concepts and possesses the ability and confidence to manage personal finances through appropriate, short-term decision-making and sound, long-range financial planning, while mindful of life-events and changing economic conditions."

The narrow definition fails to include business and managers in the definition. Financial knowledge and capabilities are critical management competencies for business development and growth. Therefore, some researchers define financial literacy in a broad way to incorporate business needs. Under this setting, financial literacy is defined as the ability to make effective decisions on the utilization of financial management, which requires knowledge, skill, attitude, and experience with goals to deal with the survival of the business, sales maximization, minimize cost and maximize wealth (Gavigan 2010, Eniola and Entebang 2016). For example, Olatunji (2015) and Esiebugie et al. (2018) define financial literacy as the managers' ability to understand and analyze financial information and act accordingly.

In general, financial literacy typically refers to the knowledge and skills to make sound/wise financial decisions in both personal and business settings. Since farmers act as business managers of their farms, it is appropriate to use the broader definition of financial literacy in this project.

Factors Affecting Financial Literacy

Many factors can affect financial literacy. These factors comprise age, gender, race and ethnicity, education, income, and employment type. The relationship between the financial literacy level and age is generally believed to follow an inverted-U-shaped curve. Financial literacy is the lowest among the young and the old. Young adults show low levels of financial literacy (Chen and Volpe 1998, de Bassa Scheresberg 2013). As the level of financial literacy declines with age, the old also score poorly on financial literacy questions (Lusardi and Mitchell 2011a, Lusardi and Tufano 2015). Gender gap in financial literacy is large and persistent. Women across all ages are less financially knowledgeable than men (Chen and Volpe 2002, Mandell 2008, Lusardi and Tufano 2015). The difference is significant and widespread around the world (Atkinson and Messy 2012, Hasler and Lusardi 2017). Many studies report differences in financial literacy across race and ethnicity. African Americans and Hispanics overall possess lower level of financial literacy (Lusardi and Mitchell 2007a, b, 2011b, d). The findings are robust across age groups and across different measures of financial literacy. People living in the rural area also show lower level of financial literacy compared to their urban counterpart (Klapper and Panos 2011). Moreover, financial literacy is positively associated with the level of education. Financial literacy is poor for those with low educational attainment (Christelis, Jappelli, and Padula 2010, Lusardi 2012, Sucuahi 2013). Financial literacy level also varies by income and employment type. Individuals with low income possess low financial literacy level and the unemployed are not as financially literate as the employees and self-employed (Lusardi and Tufano 2015, Lusardi and Mitchell 2011c).

In summary, the above literature suggests that people who are young and old, women, African Americans, Hispanics, the least educated, and those living in the rural area are disadvantaged in financial literacy. The authors hypothesize farmers, in general, have low financial literacy because most of them are elderly, not well educated, and living in rural areas. The heterogeneity in financial literacy indicates that financial literacy education strategies have to target a unique subgroup of the population to be effective (Lusardi and Mitchell 2014). Financial literacy education targeted at farmers should help them better manage their farms and improves profitability and other dimensions of farm performance.

Farm Performance

Relatively few research focuses on farm performance. Studies show that farm performance relates to liquidity, solvency, profitability, and efficiency of the farm business (Farm Financial Standards Council (FFSC) 2013, Katchova 2010).

In this research, the authors use the profitability ratio, return on assets (ROA), a farm performance measure widely used in previous literature (Gloy and LaDue 2003, Misha et al. 2009, Ahearn et al. 2018). Similar to previous research, the authors define ROA as the ratio of net farm income plus interest payment to total assets. The measure used in this study is defined as

$$ROA = \frac{NetFarmIncome \; + \; InterestPayments}{Total \; Farm \; Assets}$$

where *NetFarmIncome* is the accrual net farm income and *TotalFarmAssets* is the market value of farm assets.

The authors choose ROA as the major performance measure because ROA measures the overall efficiency of all the farm assets being used to generate net income from operations. It ties together resources, leverage, and production, and serves as an indicator of effectiveness in capital utilization. ROA also interrelates with many other measures such as efficiency and leverage, and it drives long-run financial success. Furthermore, ROA is very easy to interpret and sensitive to management actions and decisions. ROA will increase when the farmers take the right action to improve farm performance; it will decrease when the farmers make the wrong decisions in operating the farms.

Financial Literacy and Business Performance

Studies have shown that financial literacy highly correlates to business performance and economic growth. Bruhn and Zia (2011) showed that a higher level of ex-ante financial literacy helps business owners to improve their business performance and sales. Likewise, Adomako et al. (2015) found that business owners' financial literacy can enhance access to finance and thus achieve superior growth outcomes. Additionally, Kurihara (2013) indicated that the improvement of financial literacy could result in economic growth.

Much research has also shown that financial literacy positively impacts business development and business performance, especially for small and medium enterprises (Oseifuah 2010, Bruhn and Zia 2011, Adomako et al. 2015, Eniola and Entebang 2016). In business, managers and individuals consistently engaged in the decision-making process concerning procurement, planning, asset allocation, and utilization to add value to the business. Such decisions always involve financial consequences.

Studies have shown that financially literate managers help businesses to be successful. Abubakar (2015) found that financial literacy positively impacts entrepreneurship development in Africa. Tuyisenge et al. (2015) show that basic financial literacy skills, such as bookkeeping, credit management, and budgeting skills, play a critical role in the success of loan repayment among small and medium enterprises (SMEs). Furthermore, some studies found the financial literacy level among managers positively related to the survival of the enterprise (Cherugong 2015, Wise 2013). Njoroge (2013) also concluded that the success rate of small enterprises in Kenya is significantly and positively associated with the financial literacy level among the managers.

On the other hand, lack of knowledge, skills, attitude, and awareness to cope with finances among managers become a significant barrier to business success. Many businesses fail because managers make inappropriate financial decisions or the lack of financial knowledge (Joo and Grable 2000, Bosma and Harding 2006). A low degree of financial literacy prevents managers from adequately evaluating alternative solutions and maximizing business value (Drexler, Fischer, and Schoar 2014). Global Entrepreneurship Monitor (GEM)'s 2017/2018 survey revealed that manager's wrong financial decisions are the main reason for business failure. Research also found that most financial illiterate managers need improvement in the three critical areas: bookkeeping, credit management, and budgeting (Tuyisenge et al. 2015, Lakkanawanit and Dungtripop 2018).

Conceptual Model

In order to investigate the impact of financial literacy on farm performance, the authors developed the following conceptual model based on Eniola and Entebang (2016)'s theory.

Figure 1. The Framework of the Study
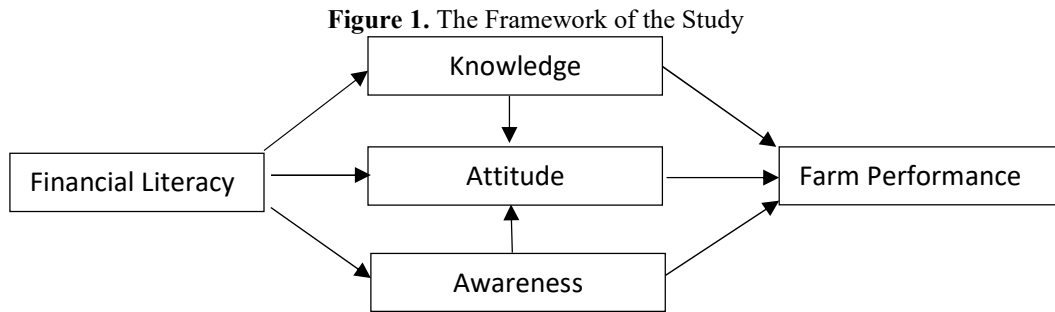
As shown in Figure 1, the concept of financial literacy consists of three dimensions: knowledge, attitude, and awareness. Knowledge is the information on business performance and business conditions that can facilitate, support, or enrich decision-making. Attitude is the application of financial principles to create value through decision making (Esiebugie et al. 2018). Increased financial knowledge and awareness can lead to improved financial attitude and behavior. Better financial knowledge, awareness, and attitude are positively linked to farm performance.

Conclusion

In conclusion, the preliminary literature review indicates that no research examines the impacts of financial literacy on farm performance. Therefore, this problem warrants a thorough investigation. Some researchers studied the connection between financial literacy and business performance (Bruhn and Zia 2011, Adomako et al. 2015, Eniola and Entebang 2017). Some scholars assessed the farm financial literacy level and financial inclusion among farmers in developing countries (Ravikumar et al.2013, Lalrinmawia and Gupta, 2015). Other researchers studied farm financial performance in the United States (Dunaway 2013, Ahearn et al. 2018). Unfortunately, the link between financial literacy and farm performance is overlooked, and the impact of financial literacy on farm performance remains unproven. Thus, this problem merits further investigation; and the authors expect that this research will provide new insight in the field of farm management and agribusiness development. Financial literacy education among farmers should greatly improve farm performance, create jobs, and ultimately enhance agribusiness development. The authors also anticipate that financial literacy education can benefit farmers and rural communities.

References

Abubakar HA (2015) Entrepreneurship development and financial literacy in Africa. World Journal of Entrepreneurship, Management and Sustainable Development, 11(4): 281-294

Adomako S, Danso A (2014) Financial literacy and firm performance: the moderating role of financial capital availability and resource flexibility. International Journal of Management and Organizational Studies, 3(4): 1-15

Adomako S, Danso A, Ofori Damoah J (2015) The moderating influence of financial literacy on the relationship between access to finance and firm growth in Ghana. Venture Capital, 18, 43-61

Ahearn MC, Liang K, Goetz S (2018) Farm business financial performance in local foods value chains. Agricultural Finance Review, 78(4): 470-488

Atkinson A, Messy F (2011) Assessing financial literacy in 12 Countries: An OECD/ INFE international pilot exercise. Journal of Pension Economics and Finance, 10 (4): 657–665

Bosma N, Harding R (2006) Global entrepreneurship monitor: GEM 2006 summary results. Babson College London Business School

Bruhn M, Zia B (2011) Stimulating managerial capital in emerging markets: The impact of business and financial literacy for young entrepreneurs. World Bank Policy Research Working Paper Series No. 5642, http://ssrn.com/abstract=1824959 (accessed 10/12/2021)

Chen H, Volpe RP (1998) An analysis of personal financial literacy among college students. Financial Services Review, 7, 107

Chen H, Volpe RP (2002) Gender differences in personal financial literacy among college students. Financial Services Review, 11 (3): 289–307

Christelis D, Jappelli D, Padula M (2010) Cognitive abilities and portfolio choice. European Economic Review, 54 (1): 18–38

Cherugong P (2015) The effect of financial literacy on performance of small and medium enterprises in Trans Nzoia county. Unpublished doctoral dissertation, University of Nairobi, Nairobi, KE

de Bassa Scheresberg, C (2013) Financial literacy and financial behavior among young adults: Evidence and implications. Numeracy, 6(2): Article 5

Drexler A, Fischer G, Schoar A (2014) Keeping it simple: Financial literacy and rules of thumb. American Economic Journal: Applied Economics, 6(2): 1–31

Dunaway TM (2013) Farm financial performance of Kentucky farms. Master's thesis, University of Kentucky

Eniola AA, Entebang H (2016) Financial literacy and SME firm performance. International Journal of Research Studies in Management, Vol 5, issue 1, 31-43

Eniola A, Entebang H (2017) SME managers and financial literacy. Global Business Review,18(3): 559–576

Esiebugie U, Richard AT, Emmanuel AL (2018) Financial literacy and performance of small and medium scale enterprises in Benue State, Nigeria. International Journal of Economics, Business and Management Research, 2(04): 65-79

Farm Financial Standards Council (2013) Financial guidelines for agriculture. https://ffsc.org/wp-content/uploads/2013/12/2014-Financial-Guidelines-for-Agriculture.pdf (accessed 10/12/2021)

Gavigan K (2010) Show me the money resources: Financial literacy for 21st century learners. Library Media Connection. 28(25):24-27

Global Entrepreneurship Monitor (GEM) 2017/2018 Global Report. https://www.gemconsortium.org/report (accessed 10/12/2021)

Gloy BA, LaDue EL (2003) Financial management practices and farm profitability. Agricultural Finance Review, 63(2): 157-74

Hasler A, Lusardi A (2017) The gender gap in financial literacy: A global perspective. Global Financial Literacy Excellence Center, The George Washington University School of Business.

Joo SH, Grable JE (2000) Improving employee productivity: The role of financial counseling and education. Journal of Employment Counseling, 37(1): 2–15

Katchova AL (2010) An analysis of the financial performance of beginning farmers. 2010 Annual Meeting of Agricultural and Applied Economics Association, Denver, Colorado,

Klapper LF, Panos GA (2011) Financial literacy and retirement planning: The Russian case. Journal of Pension Economics and Finance, 10 (4): 599–618

Kurihara Y (2013) Does financial skill promote economic growth? International Journal of Humanities and Social Science, 3(8): 92-97

Lakkanawanit P, Dungtripop W (2018) Financial literacy of native rice farmers in pak panang basin. WMS Journal of Management, 7(Special): 111-129

Lalrinmawia M, Gupta H (2015) Literacy and knowledge: farmers' financial inclusion. SCMS Journal of Indian Management, 12(3): 17-25

Lusardi A (2012) Numeracy, financial literacy, and financial decision-making. National Bureau of Economic Research, No. w17821

Lusardi A, Mitchell OS (2007a) Baby boomer retirement security: The roles of planning, financial literacy, and housing wealth. Journal of Monetary Economics, 54 (1): 205–224

Lusardi A, Mitchell OS (2007b) Financial literacy and retirement preparedness: Evidence and implications for financial education. Business Economics, 42 (1): 35–44

Lusardi A, Mitchell OS (2011a) Financial literacy and planning: Implications for retirement well-being. In Financial Literacy: Implications for Retirement Security and the Financial Marketplace, edited by Olivia S Mitchell and Annamaria Lusardi, 17–39. Oxford and New York: Oxford University Press

Lusardi A, Mitchell OS (2011b) Financial literacy and retirement planning in the United States. Journal of Pension Economics and Finance, 10 (4): 509–25

Lusardi A, Mitchell OS (2011c) Financial literacy around the world: An overview. Journal of Pension Economics and Finance, 10 (4): 497–508

Lusardi A, Mitchell OS (2011d) The outlook for financial literacy. In Financial Literacy: Implications for Retirement Security and the Financial Marketplace, edited by Olivia S. Mitchell and Annamaria Lusardi, 1–15 Oxford and New York: Oxford University Press

Lusardi A, Mitchell OS (2014) The economic importance of financial literacy: Theory and evidence. Journal of Economic Literature, 52(1): 5–44.

Lusardi A, Tufano P (2015) Debt literacy, financial experiences, and overindebtedness. Journal of Pension Economics and Finance, 14(4): 332-368

Mishra A, Wilson C, Williams R (2009) Factors affecting financial performance of new and beginning farmers. Agricultural Finance Review, 69(2): 160-179

Njoroge RM (2013) Relationship between financial literacy and entrepreneurial success in Nairobi County Kenya. Dissertation, University of Nairobi, http://erepository.uonbi.ac.ke/bitstream/handle/11295/59635/Njoroge_Relationship%20between%20financial%20literacy%20and%20Entrepreneurial%20Success%20in%20Nairobi%20County%20Kenya.pdf?sequence=2 (Accessed 10/12/2021)

Olatunji OS (2015) The impact of information communication technology on small and medium scale enterprises productivity in Nigeria.
https://www.theseus.fi/bitstream/handle/10024/94173/My_Thesis_Copy.pdf?sequence=1andisAllowed=y (Accessed 10/12/2021)

Organization for Economic Cooperation and Development (2011) Improving financial education efficiency: OECD-bank of Italy symposium on financial literacy.

Ravikumar R, Sivakumar SD, Jawaharlala M, Palanichamy NV, Sureshkumar D (2013) Assessment of farm financial literacy among jasmine growers in Tamilnadu India. Developing Country Studies, 3(13): 67-75

Remund DL (2010) Financial literacy explicated: The case for a clearer definition in an increasingly complex economy. Journal of Consumer Affairs, 44(2): 276–295

Sucuahi WT (2013) Determinants of financial literacy of micro entrepreneurs in Davao city. International Journal of Accounting Research, 1(1): 44–51

Tuyisenge HJ, Mugambi F, Kemirembe OM (2015) The role of financial literacy on loan repayment among small and medium entrepreneurs in Rwanda case study: Urwego Opportunity Bank. International Journal of Small Business and Entrepreneurship Research, 3(5):33-66

Wise S (2013) The impact of financial literacy on new venture survival. International Journal of Business and Management, 8 (23): 30-39

Hospital Frauds: How They Occur and What CPAs Can Do

Kevin Pan, Cameron Pearce, and Steven T. Jones, Samford University
Zhenyu Lai, Wuhan Institute of Technology

Abstract

Fraud can occur in hospitals just like in other organizations. However, the complexity of the healthcare system makes hospital fraud challenging to detect. To help CPAs strategize how to prevent and detect hospital frauds, the authors examined characteristics of recent hospital frauds published by the United States Department of Justice, and found five major categories of hospital frauds: fraudulent billing of medical services, illegal patient referral, managers receiving bribes, checks or credit card schemes, and fraudulent invoices. The authors explain the characteristics of these categories of hospital fraud, and offer strategies that auditors can use to prevent and detect them.

JEL Codes: I11, I19
Keywords: Fraud, audit, hospital

Introduction

The recent outbreak of COVID-19 has pushed American hospitals to the forefront of daily news. It is evident that hospitals are vital to the well-being of Americans, and hospitals face significant financial challenges due to COVID-19. To make the situation even worse, Levy (2020) argues that a situation such as COVID-19 can even increase fraud risk.

Unfortunately, hospital fraud is nothing new. Fraud can occur in any business, but it is especially devastating when dollars that could be helping patients are padding the pockets of unethical fraudsters. While Certified Public Accountants (CPAs) are not involved in frontline medical treatments, CPAs can prevent and deter hospital fraud in order to protect hospitals' financial well-being.

How Does Hospital Fraud Occur?

Hospital fraud is often masked by both complexity and collusion. The complex, indirect nature of healthcare revenue recognition allows fraud to go undetected for much longer than other industries. An important difference between medical services and other consumer goods or services is that the patient does not usually directly pay the doctor or "provider." Bills are paid by third parties, usually a governmental or private insurer.

For example, consider these contrasting scenarios. First, a customer orders a sandwich in a restaurant. The customer herself pays $6.57 for the specific sandwich she ordered based on the price displayed for that sandwich on the menu.

In contrast, a patient gets an EpiPen in the Emergency Room for an allergic reaction. That service is translated into different, specific codes based on the medicine received, how long the patient was at the hospital, how many doctors consulted with her, etc. The codes are sent to the patient's insurance provider. The insurance provider pays a portion or all of that bill based on two predetermined contracts. The first contract is between the insurance provider and the hospital network. The second contract is between the insurance provider and the patient. Even if the insurance company disclosed how much the provider will be paid for that procedure (which is typically prohibited due to confidentiality), it would then need to be analyzed along with the specific patient's healthcare history and coverage to give the patient an accurate price. Insurance companies act primarily as data processors, calculating these payments. (Note that many individuals have multiple insurers, which further complicates this process. The most prevalent example is those covered by Medicare and supplemental private insurance plans.)

Aside from the indirect nature of revenue collection, collusion (the idea that multiple people work together to commit a fraud) can make it extremely difficult to detect hospital fraud. Internal controls on management often rely on various individuals' cooperation in acting as their own checks and balances. When people start working together, internal controls can become meaningless. For example, in New York, a recent healthcare fraud of collusion was uncovered where an ambulance operator and co-conspirators subjected patients to unnecessary ambulance rides that fraudulently billed Medicare and Medicaid a total of $7 million (https://www.justice.gov/usao-edny/pr/five-doctors-and-eight-healthcare-professionals-charged-part-national-healthcare-fraud). The scheme went on for four years without being prevented or detected by external or internal auditors.

Why Collusion is a Problem

Despite external auditors attesting that financial statements are free from material misstatement from fraud or error, audits are not designed to detect fraud from collusion. Most external firms free themselves from this burden, and rightfully so. According to the Public Company Accounting Oversight Board (2002), "Collusion may cause the auditor who has properly performed the audit to conclude that evidence provided is persuasive when it is, in fact, false. As an example, the auditor may receive a false confirmation from a third party that is in collusion with management." Similarly, internal auditors may be fooled by collusion scenarios.

Therefore, in circumstances where collusion is occurring, detection may not be possible. However, as discussed below, it is possible to create procedures that improve prevention and deterrence of these types of fraud.

What Can Auditors Do?

How can auditors help identify, deter, or detect hospital fraud? To help auditors be knowledgeable and prepared, the authors reviewed all news articles from the United States Department of Justice (DOJ) with key word "hospital fraud" from July 2012 through October 2019. It was determined that the instances of hospital fraud described in these articles can be classified into five major categories. They are: (1) fraudulent billing of medical services; (2) illegal patient referrals through bribery schemes; (3) vendor managers receiving bribes; (4) checks or credit card schemes; and (5) fraudulent invoices.

Using all of the news articles that contained complete dollar impact and duration information, the authors found the average magnitude and duration of each of these categories. The sample consists of 58 news articles from DOJ, as summarized in Table 1.

Table 1: Major Types of Hospital Fraud: Summary Statistics

Type of Fraud	Number of News Articles in Sample	Sample Average Duration (Years)	Sample Average Magnitude (Millions of $)
Fraudulent billing of services	30	4.0	17.0
Illegal patient referrals	8	8.1	114.0
Vendor manager receiving bribe	7	4.9	0.8
Checks or credit card schemes	7	5.4	0.7
Fraudulent invoices	6	8.0	2.6

Below are detailed descriptions of each of these categories of fraud, including an explanation of what the fraud involves, examples, the role of the perpetrator, whom the fraud impacts, and audit strategies for prevention and detection.

Fraudulent Billing of Medical Services

Fraudulent billing of medical services accounts for 30 of the 58 cases in the overall sample, with an average of 4 years in duration and an average magnitude of $17 million. In this type of scheme, hospital providers fraudulently bill inaccurate charges to "payors" such as insurance companies or the Centers for Medicaid and Medicare Services (CMS).

Examples of this scheme include charges for procedures not performed, over-charging for procedures performed (known as "upcoding"), charges for unnecessary medical procedures, and charges for non-medical services as medical services (e.g., massage services as physical therapy services). Perpetrators may include the medical provider or the staff member who bills the payor, and collusion is sometimes involved.

The direct financial impact of this type of activity falls on the payor, whether that is an insurance company, the patient's employer (through self-insured plans), or CMS. As companies and third-party payors take on more (inaccurate) expenses, they will likely pass on those expenses to employees and policyholders in the form of higher premiums. Therefore, the indirect impact falls on employees and individuals purchasing health insurance plans.

Since perpetrators can be "creative" in how they construct fraudulent billings, it is first important for an auditor to understand how medical billing is done and paid. Next, auditors should use the following techniques to detect inaccuracies in billing.

First, medical codes used for billing should tie to medical records. For example, if the provider coded a broken arm and cast, the medical records for that patient that day should include similar observations. Auditors who validate the legitimacy of a charge should refer to and tie to medical records. It is always an auditor's responsibility to delegate work to an expert if he or she is not competent to complete it. This may be an opportunity to delegate or to work side-by-side with a coding expert called a Certified Professional Coder (CPC).

Second, sophisticated data analysis can be performed on the billing codes. An auditor can obtain the coding used for a hospital and look for trends. For example, are there excessive amounts of certain procedures? Are certain billing codes used significantly more by one provider than another peer provider? Does Benford's law identify any unusual code patterns? (Benford's law is an observation about the frequency distribution of leading digits in many real-life sets of numerical data.)

While entire departments are dedicated to analyzing coding data within both private insurance companies and CMS, all auditors (whether internal or external) should possess the data analysis and investigational skills to perform simpler tests (such as Benford's law) on smaller data samples.

Falsifying medical billing is a sophisticated and complex fraud scheme. However, auditors do possess basic skills such as tying documents together and performing data analytics to combat the scheme.

Illegal Patient Referrals Through Bribery Schemes

Illegal patient referrals account for 8 of the 58 cases in the overall sample, with an average of 8.1 years in duration and an average magnitude of $114 million. In this type of fraud, a medical professional or administrator bribes another medical professional or administrator for patient referrals. This is illegal under the U.S. Anti-Kickback Statute. In many instances, the patients may not be good candidates for the services involved, or the hospital might not be particularly well suited for providing the services in question.

The longest fraud discovered in the sample was a 15-year scheme in California. The fraudsters used a "Spinal Cap" scheme. Here, providers were bribed to perform spinal procedures at the perpetrators' hospitals, and/or to refer to those hospitals, when there were other hospitals available that were equally well suited to performing the procedures. The perpetrator is a medical professional (either provider or administrator) bribing another medical professional. They are co-conspirators, meaning that by definition collusion is always involved. The fraud tends to occur at the top of an organization. For example, the CEO of a hospital could perpetuate this fraud with another "C-suite" officer.

This fraud will be, in one sense or another, perpetrated at a patient's expense. At worst, a patient receives an unnecessary procedure. At "best," the referral is made purely for purposes of enhancing revenues, and is not in the patient's best interest. Aside from the patient's experience, the financial impact directly inflates the insurer's healthcare expenses. These expenses regularly pass back indirectly to the patient or employee over time through increased insurance premiums.

This form of bribery can be especially challenging, given that collusion often overrides the strong internal control of "segregation of duties." Auditors should consider the following deterrents. First, an anonymous tip line should be available to all employees. Monitoring, and responding to, any resulting tips should be conducted by a hospital's board of directors and legal team. Clear and consistent communication about the availability of the tip lines, as well as a non-retaliation policy, will encourage use.

Second, auditors should review provider assets such as equipment or office space given in exchange for loyalty or referrals. If any of these types of things are priced below fair market value, they should be closely questioned.

Third and finally, auditors of physician practices should perform fraud inquires that include provider staff. Probing questions about patterns in facility and provider referrals should be included and investigated.

Vendor Managers Receiving Bribes

Vendor managers receiving bribes accounts for 7 of the 58 cases in the overall sample, with an average of 4.9 years in duration and an average magnitude of $785,000. Here, an administrative manager who has the authority to grant contracts to vendors makes those decisions based on the kickbacks that he or she receives. This, of course, means that there is always collusion involved. In some instances, the collusion will extend to having co-conspirators submit false bids to make the bidding process appear competitive.

An example of this occurred in a hospital, in which the hospital administrator made a kickback agreement with two companies. One vendor paid the administrator $1.3 million for his approval and continuation of their business agreements over several years. The administrator pled guilty, received 37 months in prison, and was ordered to pay $1.3 million in restitution. This example illustrates a general pattern in which the perpetrator of this type of fraud will be an administrative manager with responsibilities for vendor hiring. Because of the nature of this type of fraud, collusion will always be involved.

With this type of fraud, the hospital or healthcare facility itself is being defrauded, and is paying higher prices for goods and services than it would otherwise pay. The higher operating costs directly impact the facility's liquidity, which ultimately impacts the patients and other stakeholders that the facility serves in the form of increased costs and fewer resources to meet needs.

Because of the collusion involved, detecting this type of bribery can be challenging for auditors. Auditors should consider the following deterrents to this type of fraud. First, no one administrator should have the sole power to grant contracts.

Segregation of duties is vital. Increasing the number of people needed to approve a contract increases the difficulty of stealing from the hospital. While furloughs and job cuts could make this difficult in light of COVID-19, it is imperative to have at least two individuals (preferably from different departments or rotating) to be involved with vendor selection and discussions.

Second, the bidding process should be transparent and objective, requiring input from many people and not just one administrator. Lack of internal oversight of the vendor process gives fraudsters ample opportunity to accept kickbacks.

Checks or Credit Card Schemes

The category of checks or credit card schemes accounts for 7 of the 58 cases in the overall sample, with an average of 5.4 years in duration and an average magnitude of $658,000. In this category of fraud, a fraudster issues checks to himself or herself, or a company credit card is used for personal expenses. To evade detection, a perpetrator might establish a shell company and issue the checks to that company's bank account, instead of making the checks out in his or her own name. In other cases, the perpetrator may attempt to avoid detection by using the name of a family member.

One recent example of this scheme occurred when a university hospital experienced a $2.8 million fraud in which checks were redirected to an administrator over a period of several years. To hide the fraud, the fraudster created fake bank accounts and bank reconciliations. These schemes are usually committed by a treasurer or controller who is an authorized credit card user and/or has access to the hospital's bank account. Collusion is significantly less likely with this type of fraud than with most other types.

Fraudulently using a hospital check or credit card will directly impact the financial statements of the hospital. This will indirectly affect the patients, because money that can improve medical care has been stolen.

To combat this type of fraud, auditors first need to gain an understanding of the hospital's internal controls. These controls should include the following: properly authorized bank accounts, separate individuals approving of and issuing checks, separate individuals performing bank statement recondition and check writing, vendor approval processes, and credit card expense audits. Even two-employee accounting departments can have the above separation of duties. Thus, there is no good excuse for a lack of segregation of duties in this area, even amidst COVID-19 labor challenges.

Also, if the person who audits or controls the credit card expense process possesses a credit card, another person should check that individual's spending statements and expense reports. Finally, bank balances should be electronically confirmed through services such as Confirmation.com.

Internal controls, specifically including segregation of duties, are the key to auditing these schemes. A lack of segregation of duties creates too much opportunity for a fraudster to steal from the hospital.

Fraudulent Invoices

Fraudulent invoices account for 6 of the 58 cases in the overall sample, with an average of 8.0 years in duration and an average magnitude of $2.6 million. With this type of fraud, falsified invoices (for instance, for non-existent medicines or equipment) are submitted to the accounting department.

For example, a laboratory director created invoices for "equipment purchases." As a general statement, these types of fraud are not necessarily committed by an accounting or financial professional. Rather, they are often committed by a non-financial manager or other employee. Collusion is not always involved, but in some cases it may be. For instance, the perpetrator might create a fake company on his or her own, or might enlist a co-conspirator to assist in the fraud.

As with the previous category of "checks or credit card schemes," this type of fraud will negatively impact the financial statements of the hospital, which will indirectly affect patients because money that could have been used to improve medical care has been stolen.

To deter or detect this type of fraud, the auditor cannot rely on simply checking whether the invoice and the receipt match; instead, he or she must "dig deep." While such fraud can occur in any organization, given the complexity of hospitals and the technical jargon involved, it is beneficial for an auditor to gain field-specific knowledge. For example, some items in the hospital are consumable, while other items are durable equipment. Having such knowledge could help to reduce both false positives (questioning a legitimate purchase) and false negatives (failing to question an illegitimate purchase).

Further, an auditor can conduct research on the price, duration of use, and exact purposes of a given piece of equipment. Whether using an expert or spending extra time researching medication and equipment, the auditor must go beyond a simple matching exercise or identifying an approval to ensure hospital expenses are valid.

Conclusions

The article reviews hospital frauds, explains how they occur, and provides suggestions for how auditors can prevent, deter, and detect hospital fraud. While general good audit practice is helpful, this review shows that the specific nature of hospital frauds calls for specialized responses. Based on their individual characteristics, the authors offer auditing strategies specific to the 5 major types of hospital fraud.

References

Levy HB (2020) Financial reporting and auditing implications of the COVID-19 pandemic: some practical guidance. The CPA Journal https://www.cpajournal.com/2020/06/08/financial-reporting-and-auditing-implications-of-the-covid-19-pandemic/

Public Company Accounting Oversight Board (2002) AS 2401: Consideration of fraud in a financial statement audit. https://pcaobus.org/oversight/standards/auditing-standards/details/AS2401

Wealth Gaps in Different Asset Categories: A Study Between Minority Groups and Whites in America

Lubenian Powell, Sandon Presley and Alex Rivera, Georgia Southern University

Abstract

This study uses Robust Least Squares regression analysis to identify the phenomena that explain the variability in the wealth gaps between minorities and Whites for the following asset categories: home equity, retirement accounts, and stocks and mutual funds. Results indicate that an increase in marriage rates and median earnings helps shrink the wealth gap in each asset category. An increase in the volatility of the market widens the wealth gap in each asset category. Therefore, minorities will benefit from increased financial literacy and incentives for marriage. A coefficient restriction test shows that the effect from an increase in median earnings remains consistent across each asset category; this suggests the possibility of a systemic issue existing within this phenomenon. Public policy prescriptions include increasing median earnings through a higher federal minimum wage and equal pay monitoring. Future research should utilize the full Survey of Income and Program Participation data set to derive more robust results to fully capture an underlying systemic issue.

Introduction

On May 25, 2020, the murder of George Floyd awakened the masses in America to protest and demand racial justice within our institutions. Initially, the conversations mainly revolved around police brutality and criminal justice reform. Rather quickly, the discussion furthered towards socioeconomic inequality between minority communities and their white counterparts. Motivated by this premise, this research analyzes wealth inequalities of different asset categories for minorities compared to Whites in America. This examination finds that marriage rates, risk tolerance, and income play key roles in determining the wealth gap for each asset category. Should these phenomena remain consistently behaved and persist throughout each category, then there exists a plausible signal for a systemic issue within the phenomena itself. Understanding these phenomena can lead to more direct policy prescriptions, some of which are addressed in the Discussion and Conclusion portion of the paper.

Literature Review

The theory discussed by Jones (2015) sheds light on how interest rates play a key role in wealth inequality. The nature of the exponentially growing interest rate is tied to a pareto inequality in wealth distribution (Jones, 2015, p. 36). Furthermore, this theory elaborates on how the difference between wealth growth rate and the interest rate promotes wealth inequality particularly between the bottom 90% and top 10% of families within a nation. Theoretically, these ideas apply to wealth inequality amongst different racial demographics especially when discussing macroeconomic policy implications within a state or nation.

Jones (2015) refers to Piketty (2014) who "notes that an increase [in population growth] means that inherited wealth gets divided up by more offspring, reducing inequality," so utilizing a variable such as a particular race as a percentage of the population could partially explain the variability in wealth distribution among different demographics (p. 37). In addition to population, Schmidt and Sevak (2006) analyze the effects of marriage rates on the amount of wealth apportioned to households with different household structures. Schmidt and Sevak (2006) measure wealth utilizing data from the Panel Study of Income Dynamics (PSID) which collects survey data on households with differing characteristics, including race. In short, Schmidt and Sevak find that household structure is significant in explaining the wealth disparities among different demographics.

Vallier (2018) discusses John Rawl's argument that "welfare-state capitalism is unjust simply because it allows for inequalities of wealth and income" (p. 145). Vallier (2018) mentions Thomas Piketty's research which concludes that "capitalism has an inherent tendency towards general inequalities of wealth" (p. 147). Furthering on this notion, findings by the European Central Bank indicates that the more welfare a state provides, the less motivated households are to accumulate

personal wealth "for precautionary reasons" (Fessler and Schürz, 2015). In other words, current research suggests more capitalism alongside more welfare leads to less asset accumulation, making for an interesting and complex policy discussion.

Kochar and Fry (2014) discuss the wealth gap data having been at all-time high levels in 2013. The dissimilar wealth proportions between whites and all other minority groups raises alarms, especially when accounting for percentage change of wealth within each race over time. Kochar and Fry (2014) offer conjecture as to how this gap has widened by suggesting that white households experience more wealth accumulation because of higher holdings of financial capital relative to minority holdings of the same. Choudhury (2001) finds that "the widening gap in nonhousing equity stems from differences in financial asset holdings, particularly risky assets" (p. 1). That is, less Blacks and Hispanics hold risky assets, and hence, a larger wealth gap is observed. Choudhury (2001) opines that savings behavior and risk aversion could explain the differences. Thompson and Suarez (2019) extend on Kochar and Fry's (2014) and Choudhury's (2001) conjecture by indicating white families "tend to report a greater tolerance for financial risk" and "have longer investment horizons" compared to Blacks and Hispanics (p. 1). Finke and Huston (2003) find that younger people are willing to take on more financial risk than those nearing retirement (p. 253). This explains their findings that the risk averse have lower mean values of retirement accounts compared to those characterized as moderately risk tolerant and risk tolerant (p. 248). This coincides with Lusardi et al. (2017) which found that "30-40 percent of US wealth inequality can potentially be attributed to financial knowledge" (p. 3). However, their model equated financial knowledge to return on savings.

Trail and Karney (2012) evaluate the responses of an over-sampled Black, Hispanic, and low-income group of individuals; they find that "low-income respondents had similar or more traditional values than high-income respondents on most value items" (p. 418). Furthermore, low-income respondents "agreed that parents who no longer love one another should stay married for the sake of the children, and they were more likely to think that divorce reflects badly on a couple" relative to the high-income respondents of the survey (p. 419). These statements indicate low-income families understand and seek out relationships exhibiting traditional family values, and they uphold marriage as a beneficial institution for raising children. However, there is "some evidence that low-income marriages face particular problems with money, substance abuse, infidelity, and friends;" notably, these are "problems not targeted by most federal marital education programs" (p. 422). An estimated $1 billion is spent annually to promote the value of marriage among low-income individuals (Trend #4: Marriage in the Twenty-First Century, 2016, p. 27). Instead, this money should be targeted towards educating low-income couples on managing household finances, addiction, and infidelity.

Cherlin (2016) finds that "men and women living in areas with greater income inequality were less likely to marry prior to having a first birth", however, this study focused on young adults who did not attain a bachelor's degree, a group that also comprises most people who have nonmarital first births (p. 765). Americans are waiting to get married until they reach higher levels of economic stability. Hence, "less successful people don't marry because they are worried about being able to stay together due to economic pressures" (Trend #4: Marriage in the Twenty-First Century, 2016, pp. 28-29). This partially explains the connection between marriage rates and income discussed in this paper: higher marriage rates indicate less income inequality since people are waiting to marry until they achieve higher economic status. Cherlin (2016) explains that "the availability of middle-skilled jobs that pay above poverty-level wages may account for at least part of the seeming effect of income inequality on the marital context of first births" (p. 766). More higher paying job opportunities lessen income inequality which increases the likelihood for marriage.

The results of this research indicate that a colinear relationship exists between marriage rates and Medicaid. As noted by Heim et al. (2017), research on expanding federal healthcare and its impact on marriage rates is "ambiguous, as marriage rates may decrease when young adults have less need for dependent health insurance through a spouse, but may increase when they are now allowed to stay on their parent's plans even if they are married (p. 1). Yelowitz (1998) found "extending Medicaid coverage to the last child in the family significantly increases the probability of marriage by 1.7 percentage points" (p. 850). He goes on to explain that being black has a much larger negative effect on marriage rates relative to the smaller negative effect on marriage rates for other nonwhites (p. 850). In contrast, an inverse relationship between Medicaid and marriage is observed by Hampton and Lenhart (2021). This can be partially explained by what Yelowitz called the "independence effect" which explains how the absence of full Medicaid coverage to all children in a household can incentivize one to either choose to forgo marriage (receive more benefits with expanded Medicaid) or divorce (meet edibility requirements of federal aid).

Theory and Model

This research examines the determinants of the wealth gap between minorities and whites in United States for the following years: 2002, 2004, 2005, 2009-2011, and 2013-2017. For this paper, minorities are defined as Black alone, Hispanic origin, and Asian alone; White is defined as White alone, no Hispanic origin. The wealth gap is measured as a ratio of the median value of minority owned equity to median value of white owned equity. Using data from the Survey of Income

and Program Participation (SIPP), three wealth categories are explored: home equity, retirement accounts, and stocks and mutual funds. The following three separate functions are estimated to observe variability in the aforementioned wealth categories:

$$HEGAP_{j,t} = \beta_0 + \beta_1 LOG(MR)_{j,t} + \beta_2 LOG(RISK) + \beta_3 LOG(GDP)_{j,t} + \beta_4 LOG(ME) + \beta_5 LOG(MEDI) + \beta_5 LOG(SMF)_{j,t} + \beta_6 LOG(RA) + \varepsilon_1 \qquad (1)$$

$$RAGAP_{j,t} = \beta_0 + \beta_1 LOG(MR)_{j,t} + \beta_2 LOG(RISK) + \beta_3 LOG(GDP)_{j,t} + \beta_4 LOG(ME) + \beta_5 LOG(MEDI) + \beta_5 LOG(HE)_{j,t} + \beta_6 LOG(SMF) + \varepsilon_1 \qquad (2)$$

$$SMFGAP_{j,t} = \beta_0 + \beta_1 LOG(MR)_{j,t} + \beta_2 LOG(RISK) + \beta_3 LOG(GDP)_{j,t} + \beta_4 LOG(ME) + \beta_5 LOG(MEDI) + \beta_5 LOG(RA)_{j,t} + \beta_6 LOG(HE) + \varepsilon_1 \qquad (3)$$

Dependent Variables:
HE:= Home equity defined as median value of primary residence (based on year 2000 US dollars)
RA:= Retirement accounts defined as median value of total investment in IRA, KEOGH, 401(k), 403(b), and 503(b) accounts (based on year 2000 US dollars)
SMF:= Median value of dividends generated from stocks and mutual funds (based on year 2000 US dollars)
HEGAP:= Ratio of black, Asian, and Hispanic HE to white HE
RAGAP:= Ratio of black, Asian and Hispanic RA to white RA
SMFGAP:= Ratio of black, Asian, and Hispanic SMF to white SMF

Independent Variables:
MR:= marriage rates for each demographic
RISK:= Standard deviation of S&P 500 Index (annual calculation)
GDP:= Real Gross Domestic Product (annual average)
ME:= Median household earnings from full-time salaried or wage workers excluding other forms of income (based on year 2000 US dollars)
MEDI := Percentage of demographic enrolled in Medicaid
ε := error term

The above general equations will yield two hypotheses:
$H_0: \beta_n = 0$ which indicates that x_n has no effect on y_k.
$H_A: \beta_n \neq 0$ which indicates that x_n has an effect on y_k.
$H_0:$ each β_n^k are equal which indicates that x_n does have the same effect on all y_k.
$H_A:$ each β_n^k are not equal which indicates that x_n does not have the same effect on all y_k.
This research generated each of the above models using a pooled data set comprised of SIPP data, Census data, and Federal Reserve Economic Data (FRED) as sources for the aforementioned years; the unit of observation for each variable is the United States. The following tables display the descriptive statistics for each function.

Table 1: EQ (1) Descriptive Statistics   N = 32

Variable	Mean	Standard Deviation	Maximum	Minimum
HEGAP	0.95	0.53	1.98	0.50
MR	0.50	0.09	0.63	0.38
RISK	76.36	31.05	115.31	29.61
GDP	16094.65	1368.41	18144.11	13493.07
ME	27461.02	6425.12	39806.88	20855.06
MEDI	0.23	0.07	0.33	0.10
SMFHAT	15838.28	11106.62	42237.45	-657.34
RAHAT	48198.75	26922.54	106492.4	-1022.12

Table 2: EQ (2) Descriptive Statistics   N = 32

Variable	Mean	Standard Deviation	Maximum	Minimum
RAGAP	0.59	0.25	1.16	0.33
MR	0.50	0.09	0.63	0.38
RISK	76.36	31.05	115.31	29.61
GDP	16094.65	1368.41	18144.11	13493.07
ME	27461.02	6425.12	39806.88	20855.06
MEDI	0.23	0.07	0.33	0.10
HEHAT	93164.06	52717.68	184018.2	37865.91
SMFHAT	15838.28	11106.62	42237.45	-657.34

Table 3: EQ (3) Descriptive Statistics   N = 32

Variable	Mean	Standard Deviation	Maximum	Minimum
SMFGAP	0.51	0.30	1.05	0.19
MR	0.50	0.09	0.63	0.38
RISK	76.36	31.05	115.31	29.61
GDP	16094.65	1368.41	18144.11	13493.07
ME	36864.38	11820.44	55322.51	24765.06
MEDI	0.23	0.07	0.33	0.10
RAHAT	48198.75	26922.54	106492.4	-1022.12
HEHAT	93164.06	52717.68	184018.2	37865.91

Schmidt and Sevak (2006) find that marriage rates for different age groups have variable effects on the wealth gap between distinct demographics. Some groups, such as young women ages 25-29, experienced less of a wealth gap while other groups have contrasting results (p. 11). If the marriage rate increases overall, then individuals may take on less risk and change savings behavior, both of which have a more consistently negative impact on the wealth gap. Hence, expected sign of marriage rate coefficient is negative; that is (-) MR. Finke and Huston (2003) note that differences in risk tolerance is the most influential phenomena that describes the variance in overall wealth accumulation (p. 252). In other words, the more risk individuals endure, the higher the expected value of assets. This paper will utilize the standard deviation of the S&P 500 Index to act as a sufficient proxy for risk aversion with an expected negative effect on the wealth gap; that is (-) RISK.

This empirical study solely includes the real gross domestic product to capture macroeconomic behavior to dampen effects from multicollinearity. The real gross domestic product is expected to have a positive effect; that is (+) GDP. Notably, this paper does not include percent of population as a variable of interest as discussed in Jones (2015). This paper's focus is not necessarily exploring the impact of race itself but rather the consequences of institutional effects that impact different races. Hence, percentage of population for each race is not included in this research model. Instead, variables of interest are constructed in a per capita manner, or the median values are taken from within different demographic populations for consistency in interpretation. Hence, median earnings is deployed to capture effects from this flow variable on each stock variable (i.e. the asset categories). The expected effect of median earnings is positive; that is, (+) ME.

To capture the effects of a welfare state, Medicaid enrollment as a percent of total demographic population is deployed as a proxy. It is assumed that since those who meet requirements for Medicaid live below a significant poverty threshold, these individuals most likely receive benefits from other forms of public assistance, as well. The expected effect of public assistance is negative as indicated by Vallier (2018); that is, (-) MEDI.

Lastly, each model has two unique variables related to the other distinct dependent variables. This construction captures the effects from different portfolio apportionments. Thompson and Suarez (2019) cite the importance of owning a home to acquire other types of wealth. However, it is expected that the median value of the home will negatively affect the portfolio apportionment for other wealth categories; that is, (-) HE. Retirement accounts reflect a propensity to save and, based on research from Samavati et al. (2013), more savings leads to less accumulation of risky assets. Since home equity is less risky than investment in financial instruments, the expected values are as follows: (+) RA in EQ (1) and (-) RA in EQ (3). As a corollary from the above argument, it is expected that investment in stocks and mutual funds will negatively affect both home equity and retirement accounts since it is a higher risk investment; that is, (-) SMF.

Importantly, the very construction of the model includes variables that address the apportionment of an individual's portfolio. More specifically, EQ (1) includes variables to account for variability caused by apportionment to retirement accounts and stocks and mutual funds (RA and SMF); EQ (2) includes variables to account for apportionment to home equity and stocks and mutual funds (HE and SMF); and EQ (3) includes variables to account for apportionment to home equity and retirement accounts (HE and RA). These variables are used in the construction of the ratios that illustrate the wealth gap in each asset category. Hence, endogeneity persists within the model.

To address this issue, instrumental variables were used to create fitted values for HE, RA, and SMF; these fitted variables are $\widehat{HE}$, $\widehat{RA}$, and $\widehat{SMF}$, respectively. Each equation constructed to derive fitted values of HE, RA, and SMF only included other endogenous variables alongside their respective instrumental variables. For $\widehat{HE}$, the change in 30-year fixed rate mortgage average in the United States acted as a proxy for consumer's willingness to purchase homes at a given point in time. For $\widehat{RA}$, the annual average of the personal savings rate was used as a proxy for long-term savings behavior. For $\widehat{SMF}$, the annual average of the effective federal funds rate proxied for the overall return on financial instruments in the market. Once these variables were constructed, the Heckman Test was performed; results indicate that endogeneity had been properly corrected for. The Heckman Test is designed to analyze whether or not endogeneity still persists within a model. To deploy the test, both the original variable and the fitted variable were included in the model and then the statistical significance of the fitted variable was checked. If the fitted variable is statistically significant, then endogeneity still persists.

Results

Due to data limitations, equations (1-3) were initially estimated using panel ordinary least squares (OLS) method with race as the cross sections and an instrumental, annual time substitute. To dampen the effects of multicollinearity, all independent variables were transformed into logarithmic form. The correlation matrices displayed in Tables 4-6, on the next page, display that multicollinearity is persistent, so two separate versions of each equation were observed. One equation includes MR and excludes MEDI while the other excludes MR and includes MEDI. This manipulation helped lessen the effects of multicollinearity stemming from these variables. After performing the Heckman Test, it was determined that simultaneity persisted between LOG(HE), LOG(RA), and LOG(SMF). Endogeneity was expected considering the construction of each model includes other categories of wealth. Since each equation consists of different right-hand side variables, the following versions of instrumental variables were constructed to correct for this perpetual endogeneity: $\widehat{HE}$, $\widehat{RA}$, $\widehat{SMF}$.

Table 7 displays the estimated least squares regression results. Notice that each Breusch-Pagan test statistic for heteroskedasticity indicates that there is not enough evidence to reject the notion that these equations are homoskedastic.

Although the variables from the above equations have been corrected for the most accurate interpretations, the inconsistent distribution of the dependent variables limits the reliability of the significance levels. The distribution of data of the first two cross sections consisting of Blacks and Hispanics follow a similar distribution around a smaller mean while the third cross section, Asians, follows a distribution around a larger mean. Since this data set is limited in observations, the ten observations in the third cross section act like outliers which distort the results of the least squares regression leading to higher probability of type I error. Therefore, it is appropriate to deploy robust least squares method for more accurate test statistics to derive proper conclusions. The robust estimation type deployed was M-estimation using the bisquare function to apply weights. Scale estimates were set to median centered, and Huber Type I was applied as the covariance type. Table 8 displays the robust least squares regression results. Only significant results from Table 8 will be used in the discussion and conclusion.

Table 4: EQ (1) Correlation Matrix

	RAGAP	LOG(MR)	LOG(RISK)	LOG(GDP)	LOG(ME)	LOG(MEDI)	LOG($\widehat{RA}$)	LOG($\widehat{HE}$)
SMFGAP	1.00							
LOG(MR)	0.84	1.00						
LOG(RISK)	-0.23	-0.08	1.00					
LOG(GDP)	-0.06	-0.05	0.49	1.00				
LOG(ME)	0.81	0.68	0.09	0.17	1.00			
LOG(MEDI)	-0.84	-0.81	0.31	0.34	-0.79	1.00		
LOG($\widehat{RA}$)	0.57	0.55	0.28	0.67	0.77	-0.38	1.00	
LOG($\widehat{HE}$)	0.88	0.84	-0.11	0.22	0.90	-0.82	0.79	1.00

Table 5: EQ (2) Correlation Matrix

	HEGAP	LOG(MR)	LOG(RISK)	LOG(GDP)	LOG(ME)	LOG(MEDI)	LOG($\widehat{\text{SMF}}$)	LOG($\widehat{\text{RA}}$)
HEGAP	1.00							
LOG(MR)	0.86	1.00						
LOG(RISK)	-0.13	-0.08	1.00					
LOG(GDP)	0.05	-0.05	0.49	1.00				
LOG(ME)	0.91	0.68	0.09	0.17	1.00			
LOG(MEDI)	-0.89	-0.81	0.31	0.34	-0.79	1.00		
LOG($\widehat{\text{SMF}}$)	0.80	0.74	-0.02	0.44	0.76	-0.56	1.00	
LOG($\widehat{\text{RA}}$)	0.69	0.55	0.28	0.67	0.77	-0.38	0.85	1.00

Table 6: EQ (3) Correlation Matrix

	RAGAP	LOG(MR)	LOG(RISK)	LOG(GDP)	LOG(ME)	LOG(MEDI)	LOG($\widehat{\text{HE}}$)	LOG($\widehat{\text{SMF}}$)
RAGAP	1.00							
LOG(MR)	0.79	1.00						
LOG(RISK)	-0.04	-0.08	1.00					
LOG(GDP)	0.15	-0.05	0.49	1.00				
LOG(ME)	0.92	0.68	0.09	0.17	1.00			
LOG(MEDI)	-0.78	-0.81	0.31	0.34	-0.79	1.00		
LOG($\widehat{\text{HE}}$)	0.91	0.84	-0.11	0.22	0.90	-0.82	1.00	
LOG($\widehat{\text{SMF}}$)	0.80	0.74	-0.02	0.44	0.76	-0.56	0.90	1.00

Results in Table 8 display mixed results as far as accuracy in predicted coefficient signs. The following are correct predictions across equations $(1\text{-}3)_a$ and $(1\text{-}3)_b$: (-) RISK, (+) ME, and (+) RA in equation 1_b alongside (-) RA in equation 3_b. RISK is significant at the 99, 95, and 90 percent confidence level in equations $(1\text{-}3)_a$, respectively, but it is not significant at any confidence level in equations $(1\text{-}3)_b$. ME is significant at the 99, 99, 90, and 99 percent confidence level in equations $(1\text{-}3)_a$ and 2_b, respectively. RA is not statistically significant at any confidence level in equations 1_b and 3_b.

Notably, the results in Table 8 display adjusted R-squared values of 0.47, 0.65, 0.69, 0.42, 0.45, and 0.68 for each respective equation read from left to right. This signals that a moderate amount of variability in the wealth gaps for each asset category is explained by the variables of interest in estimated equations (1-3). Table 9 shows the results of the Wald Test performed on statistically significant variables from equations $(1\text{-}3)_a$ in Table 8. Since no variables of interest are consistently statistically significant in equations $(1-3)_b$, the second hypothesis cannot be tested on this version of the model. These variables include LOG(MR), LOG(RISK), and LOG(ME).

The following are the actual resulting coefficient signs from equations $(1\text{-}3)_a$ and $(1\text{-}3)_b$ that are inconsistent with their predicated values: (+) MR in equations $(1\text{-}3)_a$; (+) GDP in $(1\text{-}3)_a$ and 1_b but (-) GDP in $(2\text{-}3)_b$; (-) MEDI in 1_b but (+) MEDI $(2\text{-}3)_b$; (-) HE in 2_b but (+) HE in 3_a and $(2\text{-}3)_b$; (-) RA in 1_a and 3_a; and (-) SMF in 1_a but (+) SMF in 2_a and $(1\text{-}2)_b$. MR is statistically significant at the 99, 99, and 95 percent confidence level in equations $(1\text{-}3)_a$, respectively. GDP is only statistically significant at the 95, 90, and 90 percent confidence level in equations 1_a, 2_a, and 3_b, respectively. MEDI is only statistically significant at the 99 percent confidence level in equation 1_b. HE is only statistically significant at the 95 percent confidence level in equation 3_b. RA is only statistically significant at the 95 percent confidence level in equation 1_a. Lastly, SMF is not statistically significant at any level across all equations.

Results from Table 9 indicate the null hypothesis for the Wald Test is rejected at the 99 percent confidence level for the coefficients of LOG(MR) and LOG(RISK). Furthermore, there is no sufficient evidence to reject the null hypothesis of the Wald Test for the coefficients of LOG(ME).

Table 7: OLS Regression Results

Independent Variable				Dependent Variable		
	HEGAP (1$_a$)	RAGAP (2$_a$)	SMFGAP (3$_a$)	HEGAP (1$_b$)	RAGAP (2$_b$)	SMFGAP (3$_b$)
LOG(MR)	1.48***	0.75**	0.90**	-	-	-
	(6.01)	(3.11)	(2.37)			
LOG(RISK)	-0.23***	-0.14**	-0.16*	-0.01	-0.02	-0.004
	(-4.02)	(-2.48)	(-1.79)	(-0.38)	(-0.37)	(-0.05)
LOG(GDP)	1.57**	0.82*	0.69	0.74	-0.35	-1.61
	(2.58)	(1.96)	(0.77)	(1.11)	(-0.50)	(-1.63)
LOG(ME)	1.89***	1.20***	0.87*	0.46	0.74***	0.24
	(8.92)	(5.02)	(1.96)	(1.34)	(1.32)	(0.67)
LOG(MEDI)	-	-	-	-0.98***	0.09	0.38
				(-3.90)	(0.29)	(1.04)
LOG($\widehat{SMF}$)	-0.07	0.0001	-	0.15**	0.05	-
	(-0.87)	(0.002)		(2.32)	(0.53)	
LOG($\widehat{RA}$)	-0.22	-	-0.17	0.06	-	-0.06
	(-1.55)		(-1.05)	(0.43)		(-0.37)
LOG($\widehat{HE}$)	-	-0.27	0.01	-	0.16	0.72***
		(-1.67)	(0.06)		(0.58)	(2.83)
R-Square	0.96	0.92	0.87	0.95	0.89	0.85
Adj. R-Square	0.95	0.90	0.84	0.94	0.86	0.81
F-Stat	95.27	46.12	27.22	77.79	31.86	22.45
Breusch-Pagan Test	3.40	5.30	1.89	3.78	2.85	1.60
N	31	31	31	31	31	31

Notes: N equals the number of observations; each equation has 31 observations because SMFHAT has a negative fitted value of which the logarithmic transformation cannot be applied. ***, **, and * indicate significance at the 1%, 5%, and 10% level.

Table 8: Robust Least Squares Regression Results

Independent Variable				Dependent Variable		
	HEGAP (1$_a$)	RAGAP (2$_a$)	SMFGAP (3$_a$)	HEGAP (1$_b$)	RAGAP (2$_b$)	SMFGAP (3$_b$)
LOG(MR)	1.48***	0.74***	0.88**	-	-	-
	(5.74)	(2.85)	(2.16)			
LOG(RISK)	-0.18***	-0.15**	-0.16*	-0.01	0.05	0
	(-2.92)	(-2.34)	(-1.72)	(-0.18)	(1.24)	(-0.01)
LOG(GDP)	1.94**	0.81*	0.62	0.66	-0.79	-1.76*
	(2.48)	(1.80)	(0.64)	(0.79)	(-1.28)	(-1.66)
LOG(ME)	1.90***	1.19***	0.87*	0.29	0.54***	0.26
	(7.78)	(4.63)	(1.83)	(0.80)	(2.83)	(0.68)
LOG(MEDI)	-	-	-	-1.06***	0.20	0.39
				(-4.86)	(0.76)	(0.98)
LOG($\widehat{SMF}$)	-0.04	0.005	-	0.13	0.03	-
	(-0.44)	(0.06)		(1.54)	(0.41)	
LOG($\widehat{RA}$)	-0.30**	-	-0.16	0.12	-	-0.02
	(-2.02)		(-0.91)	(0.75)		(-0.08)
LOG($\widehat{HE}$)	-	-0.28	0.02	-	0.32	0.69**
		(-1.57)	(0.09)		(1.34)	(2.54)
R-Square	0.57	0.72	0.75	0.69	0.56	0.74
Adj. R-Square	0.47	0.65	0.69	0.42	0.45	0.68
N	31	31	31	31	31	31

Notes: N equals the number of observations; each equation has 31 observations because SMFHAT has a negative fitted value of which the logarithmic transformation cannot be applied. ***, **, and * indicate significance at the 1%, 5%, and 10% level.

Table 9: Wald Test Results for EQs (1-3)$_a$

Condition, Variable Tested	t-statistic
Given LOG(MR) = 1.48, LOG(MR) = 0.74	-4.26***
Given LOG(MR) = 1.48, LOG(MR) = 0.88	-4.28***
Given LOG(RISK) = -0.18, LOG(RISK) = -0.15	6.31***
Given LOG(RISK) = -0.18, LOG(RISK) = -0.16	6.37***
Given LOG(ME) = 1.90, LOG(ME) = 1.19	0.96
Given LOG(ME) = 1.90, LOG(ME) = 0.87	1.37

Note: The null hypothesis of the Wald Test states that the coefficient equals another given value; *** indicates a rejection of the null hypothesis at the 99 percent confidence level.

Discussion and Conclusion

Similar to Cherlin (2016) and contrary to findings by Schmidt and Sevak (2006), there is sufficient evidence that marriage rates have a positive effect on the wealth gap in different asset categories. Without loss of generality, the discussion and conclusion will assume that the ratio of minority to white categorical wealth is less than 1. Hence, a negative coefficient widens the wealth gap, and positive coefficient diminishes it. Should a minority begin with more wealth than whites (i.e. a ratio greater than 1), then the interpretation of the coefficients would be reversed. The statistical significance in equations (1-3)$_a$ indicates that a one percent increase in MR yields a 1.48, 0.74, and 0.88 percentage point decrease in the wealth gaps for home equity, retirement accounts, and stock and mutual funds, respectively. Although these effects are not consistent across each equation, married individuals are accumulating more assets across all three categories helping to shrink the wealth gap. This implies that some other unobserved variable, perhaps related to marriage, is generating different effects within each asset category making the marriage variable more volatile throughout each function. Perhaps the increased likelihood of a two-income household allows for a greater safety net for married couples to fall back on should they choose to invest more aggressively. Not to mention, there are external benefits from marriage that income does not necessarily capture such as housework and childcare. These benefits may allow a married couple to reap the benefits of cost minimizing which permits greater initial investment.

In equations (1-3)$_a$, a one percent increase in the risk of the investment market yields a 0.18, 0.15, and 0.16 percentage point increase in the wealth gaps for home equity, retirement accounts, and stock and mutual funds, respectively. This conclusion coincides with Finke and Huston's (2003) findings. Like marriage rates, this effect by RISK is not consistent throughout each equation signaling that there is some other unobserved effect similar to, but not captured by, RISK. In equations (1-3)$_b$, the risk in the investment market acts as a control variable with no statistical significance which contradicts Finke and Huston's (2003) findings.

The statistical significance of GDP in equations 1_a, 2_a, and 3_b indicates that a one percent increase in GDP yields a 1.94, 0.81, and -1.76 percentage point change in the wealth gaps for home equity, retirement accounts, and stock and mutual funds, respectively. More specifically, the increase in GDP helps shrink the home equity and retirement account wealth gaps while also increasing the wealth gap in stocks and mutual funds. It is possible that minorities are not receiving the same returns in the stock market during a booming economy from less initial investment and higher risk aversion as indicated by Thompson and Suarez (2019).

Regarding median value of retirement accounts, the statistically significant result in equation 1_a reveals a one percent increase in RA generates a 0.30 percentage point increase in the wealth gap for home equity. It could be that the initial apportionment of funds is a preference for retirement versus residential property. The consumption of residential property is more of a short-run behavior than planning for retirement; hence, more emphasis placed on retirement planning, the less adamant individuals are to purchase expensive homes. Although saving for retirement greatly increases the chance of intergenerational wealth transfer, equal housing will continue to evade minorities in the short run. Should this be the only change made in marginalized communities, it could take generations for there to be any significant decrease in the wealth gaps of other asset categories.

The median value of stocks and mutual funds has no statistically significant effect in any of the equations. This suggest that any apportionment to this asset category does not contribute to any increase or decrease in the wealth gaps for home equity and retirement accounts. As for the median value of home equity, there is a statistical significance in equation 3_b signifying that a one percent increase in HE produces a 0.69 percentage point decrease in the wealth gap for stocks and mutual funds. This conclusion parallels conjecture by Thompson and Suarez (2019) in which homeownership plays a key

role in an individual's risk tolerance and investment horizon. Therefore, the value of one's residential property may act like a safety net or collateral to fall back on which encourages more risky investments yielding higher returns.

The statistically significant results of median earnings for equations $(1\text{-}3)_a$ implies that a one percent increase in ME yields a 1.90, 1.19, and 0.87 percentage point decrease in the wealth gaps for home equity, retirement accounts, and stock and mutual funds, respectively. Note that a one percent increase in ME yields a 0.54 percentage point decrease in the wealth gap in equation 2_b, as well. However, the discussion focuses on the implications from the coefficient test from which more impactful conclusions can be made. These effects are stable on each wealth category which strongly signals that a fundamental issue persists within this phenomenon. This implies that there is no unobserved variable generating different effects within each wealth category. However, this entangles with another area of great concern and controversy: income inequality. As discussed by Jones (2015), the pareto inequality in income is substantially less than that of wealth, mainly because wealth is held in excessive value compared to income earned. Coinciding Jones' (2015) notion with findings from this paper, an efficient public policy implication would be to address the federal minimum wage alongside equal pay monitoring to ensure the wage gap between marginalized individuals and whites continues to be reduced.

In conclusion, the most important phenomena to address, from a public policy and wealth equality perspective, are marriage rates, financial literacy, and income. Stronger incentives for marriage alongside financial instrument literacy would greatly narrow the wealth gap experienced by minorities in the United States. More specifically, the findings of this paper deduce that a systemic issue most likely exists within institutions established to keep the minimum wage alarmingly low along with the ever-persistent glass ceiling faced by minorities and women in America. This conclusion parallels that of Thomas Piketty who Vallier (2018) thoroughly critiques without ever dissenting. Although unequivocally granting higher wages may be a fanciful notion in America, better education in minority communities with a strong focus on incentivizing marriage and financial literacy is not only pragmatic, but a responsibility of those in positions of political power.

References

Cherlin AJ, Ribar DC, Yasutake S (2016) Nonmarital first births, marriage, and income inequality. American Sociological Review 81: 749–770

Choudhury S (2001) Racial and ethnic differences in wealth and asset choices. Social Security Bulletin 64: 1-15

Finke MS, Huston SJ (2003) The brighter side of financial risk: financial risk tolerance and wealth. Journal of Family and Economic Issues 24: 233-256.

Hampton M, Lenhart O (2021) The effect of the Affordable Care Act Medicaid expansion on marriage. Economic Inquiry https://doi.org/10.1111/ecin.13052

Heim B, Lurie I, Simon KI (2017) The impact of the Affordable Care Act young adult provision on childbearing, marriage, and tax filing behavior: evidence from tax data. working paper series, 23092

Jones CI (2015) Pareto and Piketty: The macroeconomics of top income and wealth inequality. Journal of Economic Perspectives 29: 29-46. https://doi.org/10.1257/jep.29.1.29

Kochar R, Fry R (2014) Wealth inequality has widened along racial, ethnic lines since end of Great Recession. Pew Research Center https://www.pewresearch.org/fact-tank/2014/12/12/racial-wealth-gaps-great-recession/

Lusardi A, Michaud PC, Mitchell OS (2017) Optimal financial knowledge and wealth inequality. Journal of Political Economy 125: 1-3

Private wealth across European countries: Income, Inheritance, and the Welfare State (2016). Wall Street Journal https://www.wsj.com/articles/private-wealth-across-european-countries-income-inheritance-and-the-welfare-state-1456434899

Samavati H, Adilov N, Dilts DA (2013) Empirical analysis of the saving rate in the United States. Journal of Management Policy and Practice 14: 46-53

Schmidt L, Sevak P (2006) Gender, marriage, and asset accumulation in the United States. Feminist Economics 12: 139-166.

Thompson JP, Suarez GA (2019) Accounting for Racial Wealth Disparities in the United States. Federal Reserve Bank of Boston Research Department working papers No. 19-13. https://doi.org/10.29412/res.wp.2019.13

Trail TE, Karney BR (2012) What's (not) wrong with low-income marriages. Journal of Marriage and Family 74: 413-427 http://dx.doi.org/10.1111/j.1741-3737.2012.00977.x

Trend #4: Marriage in the twenty-first century (2016). Trends Magazine, 164: 23–30.

Vallier K (2018) Rawls, Piketty, and the critique of welfare-state capitalism. The Journal of Politics 81 (1), 142-152. http://dx.doi.org/10.1086/700108

Yelowitz AS (1998) Will extending Medicaid to two- parent families encourage marriage? The Journal of Human Resources 33: 833-865. https://doi.org/10.2307/146400

Data Appendix

Current population survey annual social and economic supplement (2019) historical income tables: households [data set]. U.S. Census Bureau https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-income-households.html

Current population survey annual social and economic supplements (2019) historical marital status tables [data set]. U.S. Census Bureau https://www.census.gov/data/tables/time-series/demo/families/marital.html

Current population survey annual social and economic supplements (2019) historical tables on school enrollment [data set]. U.S. Census Bureau. https://www.census.gov/data/tables/time-series/demo/school-enrollment/cps-historical-time-series.html

Current population survey annual social and economic supplements (2019) POV-01 Age and sex of all people, family members, and unrelated individuals [data set]. U.S. Census Bureau https://www.census.gov/data/tables/time-series/demo/income-poverty/cps- pov/pov-01.2002.html

Current population survey annual social and economic supplements (2019) PINC-10 wage and salary workers-people 15 years old and over by total wage and salary income, work experience, race, hispanic origin, and sex [Data set]. U.S. Census Bureau. https://www.census.gov/data/tables/time-series/demo/income-poverty/cps-pinc/pinc-10.2019.html

Federal funds data (2020) 10-year treasury constant maturity rate [data set]. Board of Governors of the Federal Reserve System. https://fred.stlouisfed.org/series/DGS10#0

Federal funds data (2020). 30-year fixed rate mortgage average in the United States [data set]. Freddie Mac. https://fred.stlouisfed.org/series/MORTGAGE30US

Federal funds data (2020) effective federal funds rate [data set]. Federal Reserve Bank of New York. https://fred.stlouisfed.org/series/EFFR

Federal funds data (2020) real gross domestic product [data set]. U.S Bureau of Economic Analysis https://fred.stlouisfed.org/series/GDPC1

Survey of income and program participation (2017) wealth and asset ownership data tables [data set]. U.S. Census Bureau. https://www.census.gov/topics/incomepoverty/wealth/library/publications.html

S&P 500 historical data [data set]. Yahoo Finance (2020) https://finance.yahoo.com/quote/%5EGSPC/history?p=%5EGSPC

The Impact of the Covid-19 Pandemic Shutdown on the Long Island, NY Regional Economy

Richard Vogel, Farmingdale State College

Abstract

Prior to the Pandemic recession, unemployment on Long Island (LI) averaged well below 4 percent, weekly earnings were increasing, and the economy appeared on course to grow at a rate comparable to the previous year. The Covid-19 shutdown idled all but essential activities and work that could be conducted remotely from home, leading to record filings for unemployment benefits, increasing dramatically from March through June 2020, and remained high throughout the rest of 2020. This study evaluates the impact on the LI economy and the potential consequences on growth in the region.

Introduction

Long Island's economy was running strongly through the middle of March, 2020, with economic indicators such as unemployment averaging well below 4 percent, average weekly earnings increasing, and overall strong growth prospects for the rest of the year. As coronavirus cases began to surge, local city and county governments, following advice from public health officials, began to order businesses to shut down, which was ultimately followed by New York Governor Cuomo ordering the closure of all non-essential businesses, the implementation of a requirement for individuals to wear facemasks in public, and limits on the operation of all but essential businesses. With only essential businesses such as supermarkets and drugstores or activities that firms and organizations maintaining operations remotely from home, unemployment surged dramatically, leading to leading to record filings for unemployment benefits from mid-March to early June.

As the spread of the virus was contained, NY State issued its NY Forward Plan in May 2020 outlining guidelines for reopening its economy in phases. LI entered Phase 1 of the reopening on May 27 and economic activity began to return. The impacts of the shutdown on the region's economy were severe and distinctly different in many ways from those associated with an ordinary economic downturn or natural disaster. This downturn was the direct result of a public health/government policy to reduce social interactions to reduce the spread of Covid-19. The initial shutdown on LI lasted nearly eight weeks closing most small and medium sized firms excluding essential businesses and activities in healthcare, transportation and utilities, manufacturing and retail (Empire State Development, 2020).

Despite the closure orders, significant parts of the economy continued to operate unabated, albeit in a socially distanced manner. Many brick and mortar retail establishments suffered serious losses, but online retail sales or retailers that were quickly able to establish an online presence flourished. Most offices were forced to close, but this did not necessarily mean that the firms or activities of the companies were halted. Firms, local and state government offices, and service providers pivoted to the use of new and emerging telecommuting tools for employees to continue to work from home instead of the office. Educational services from K-12 to colleges and universities moved from traditional classroom instruction to online instruction with varying degrees of success.

This study evaluates the current state of Long Island's recovery and the potential long-term economic impacts from the Covid-19 shutdown. A preliminary analysis of Covid's impact on LI is presented using both ordinary least squares (OLS) and vector autoregression (VAR). A more in-depth analysis is planned in the future. The rest of this paper is organized as follows. Section 2 provides an overview of the economic issues associated with disasters the current health emergency. Following that, Section 3 provides an overview and analysis of LI's economy over the past year. Section 4 provides a preliminary econometric analysis of Covid-19 on the regional economy. The conclusions of this study are presented in Section 5.

Hazardous Events, Pandemics, and the Economy

Hazard situations present the regional economic landscape with the threat of serious and sometimes cataclysmic disaster. Alongside possible physical impact and destruction, employment and income may be affected – the result of damage to economic infrastructure, individual firms, and population displacement. In the aftermath of weather and geophysical events, recovery consists of three primary concerns -- replacement of damaged infrastructure and housing, recovery of employment

and income, and the restoration of regional and interregional linkages and economic relationships. The Pandemic shutdown presented LI with similar problems albeit without the physical destruction of infrastructure and capital.

Economic geographers and economists link regional growth and development to external economies, economies of agglomeration, subcontracting activities, the urban center's role in information exchange, and intellectual spillovers (Redding, 2009; Fujita and Thisse, 2008; Candau, 2008; Overman, Rice and Venables, 2007; Fujita and Krugman, 2004). Briefly stated, growth occurs as a result of these linkages and externalities. In turn, continued growth depends upon deepening and expansion of these linkages and externalities. Both the Pandemic shutdown and Covid-19 related social distancing and business regulations may directly impact those linkages especially as some firms within the region are unable to reopen and new modes of firm operation (telecommuting technologies, etc.) result in the breakdown of some of those linkages.

Vulnerability arises from three primary sources. The first source is direct impact losses. In this case, a significant portion of Long Island's economy was temporally idled. Temporary disruptions of economic activity may lead to some in changes in the pattern of intraregional and interregional trade. And lastly, the pandemic may also lead to structural changes in the region's economy.

In their recent study of the economic impact of the pandemic, Aliyev and Mursalli (2020) point out that while events such as these may often be referred to as Black Swan events (unforeseen events) with potential large-scale impacts, there are numerous examples of the events through history such as the black plague of the fourteenth century and the 1918 Spanish Flu. Their study on the impacts of the current pandemic is very preliminary, having been written and presented within just a few months of its start. Similarly, Babuna et al's (2020) study of the economic effects of Covid-19, found potential significant losses or reduced profits to the insurance sector in Ghana resulting from an increase in claims and decrease in premiums being paid. Clay et al's (2018) research found that mortality rates due to the 1918 influenza pandemic were higher in cities with poorer air quality.

Keogh-Brown et al (2010), utilizing a CGE model of the UK, France, Belgium and The Netherlands, evaluated the potential impact of a possible flu pandemic, concluding that losses in each of the four countries' GDP could be as high as 2 percent. Their analysis was predicated upon illness related changes to labor and labor supply, specifically by modeling two strategies – 1) school closures that impact child-care decisions of households and 2) a vaccine with different levels of effectiveness. They concluded that more labor-intensive sectors (service oriented) will be more deeply affected than other sectors (in particular, agriculture). The authors also point out the level of economic impact from a pandemic is highly dependent upon the types of strategies that are used to combat it.

Kelso et al (2013), using a community simulation model for an Australian community of 30,000 people found that an influenza A type pandemic could have an impact ranging from $441 to $8551 per person depending upon the severity of the illness. They utilized an individual-based simulation model involving a population and transmission module with both epidemiological and intervention parameters, a health outcomes module, and an economic analysis module. They conclude that for pandemics with the highest level of severity, following a strategy of strong and rigorous social distancing policies would lead to the lowest total social and economic costs. Conversely, these types of policies and strategies would not be realistic or acceptable for low severity pandemics.

Two recent studies, one by Lenzen et al (2020) and the other by Chernick et al (2020) provide early estimates of the potential economic impacts upon the economy. Chernick et al focuses on the fiscal impacts on city finances. Using a sample of 150 cities across the United States and combining estimates of employment loss and lost earnings in each city, and potential revenue losses in each city, they estimate overall potential economic impact for fiscal years 2020 and 2021. The most stable revenue cities receive is through property taxes, but sales tax revenues, individual income tax revenues, user fees and state aid in the wake of a financial downturn (as a result of the Covid-19 shutdown) may vary dramatically. They found that a city's forecast fiscal state is highly dependent upon the underlying revenue structure and the overall additional costs that the coronavirus may impose upon it. Lenzen et al (2020) focused upon the global level economy and found that global output has fallen by as much as $3.8 trillion and atmospheric gas emissions that contribute to global warming have fallen off dramatically.

There are numerous methodologies currently being used to analyze Covid-19's economic impact. One recent study by Fezzi and Fanghella (2020) uses market level electric power usage to estimate the economic impact of Covid-19. They used daily sectoral consumption data for industrial, commercial and public services, residential, and other (transport, agriculture, forestry and fishing) from Italy, to create a times series analysis using both OLS with heteroscedasticity and autocorrelation consistent corrections (HAC) and an autoregressive (AR(1)) structure. Their model has the benefit of providing timely estimates of short-term economic impact as it relies upon easily observed market data that is reported in close to real-time. They conclude that Italy's lockdown reduced GDP by approximately 30 percent. Another recent paper by Mitra et al (2020), using Covid-19 age specific mortality rates and potential years of life lost data (PYLL), estimated the costs or impact for Germany, Italy and the United States. PYLL costs were found to be higher in the U.S. (and even higher in New York) than Italy (which was followed by Germany). They also found though that individual countries should revise the PYLL figures as

life expectancy has changed significantly over the years, and that there was a need for better data collection on premature deaths due to the coronoa virus.

Covid-19, the National Economy and Long Island

While there had been concerns as to the state of the national economy towards the end of 2019, economic activity was still relatively strong. Table 1 below shows that year over year, the unemployment rate for the US, NY State, and LI were on the rise by the end of March 2020 and had increased to 4.5 percent, 4.4 percent and 4.0 percent respectively. NY's economy had been fully operating until approximately March 15th, so the shutdown that took place was just beginning to manifest itself. The US Bureau of Labor Statistics reported that between March 2020 and July 2020, LI's unemployment rate shot up from 3.8 percent in March to 16.1 percent in April, receding to between 12.3 percent and 13.8 percent between May through July (Table 2).

Table 1: Change in Employment and Unemployment March 2019-March 2020 (in thousands)

Area	Employed 3/20	Employed 3/19	Unemployed 3/20	Unemployed 3/19	Unemployment Rate 3/20	Unemployment Rate 3/19
U.S.	155,167	156,441	7,370	6,382	4.5%	3.9%
NY	9020.1	9128.6	417.8	400.6	4.4%	4.2%
Nassau-Suffolk	1432.6	1425.3	58.9	53.3	4.0%	3.6%

Source: NY State Department of Labor

Table 2: LI Employment Market, March 2020-July 2020 (thousands)

	Mar	Apr	May	June	July
Civilian Labor Force	1,484.80	1,427.50	1,461.10	1,494.60	1,554.8
Employment	1,427.90	1,198.30	1,282.10	1,303.20	1,339.7
Unemployment	56.9	229.3	179	191.3	215.1
Unemployment Rate	3.8%	16.1%	12.3%	12.8%	13.8%

Source: U.S. Bureau of Labor Statistics

Over ten-month period (April 2020 to January 2021) LI improved as various parts of the region's service-oriented economy reopened. There are however many sectors that have not been able to return to full capacity (retail, hospitality, restaurants, entertainment venues, sports and fitness clubs, etc.). As can be seen in Figure 1, beginning with the end of March 2020, employment on Long Island dropped precipitously, especially in the Leisure and Hospitality and Retail sectors, and only started to return in June and July.

As of February 2021, there were 279 thousand confirmed cases of Covid-19 on LI and 5578 deaths directly attributed to it. Between March 14 and May 9, 2020, there were 288,787 filings for unemployment on LI, an increase of 271,124 filings over the same period in 2019. Since the start of the Covid-19 crisis in March, unemployment claims, which initially jumped to 60,000 per week, and were hovering at approximately 10,000, close to 5 times the normal level for the region through the first two months of 2021. From November 2020 through February 2021, testing rates for Covid-19 on LI ranged from approximately 20 thousand to as high as 55 thousand per day, with a positivity rate ranging from as low as 1.5 percent on November 1st to 10.5 percent on January 5th, 2021

The CARES act passed at the federal level in March 2020 provided for an expansion of eligibility for unemployment insurance, a temporary addition of $600 a week unemployment benefit (which expired at the end of July), and a Payroll Protection Loan Program (PPP) which could be used to support primarily business payroll expenses. The Federal Reserve provided additional liquidity and loan support to the corporate and financial sector. In December of 2020, a second round of Coronavirus relief was enacted. The new bill included an extension of unemployment benefits, the temporary addition of Federal Pandemic unemployment benefits at $300 a week through March 14, 2021, a revamped and modified PPP program for firms with up to 300 employees, $600 direct payments to households and individuals with incomes below $75,000 in adjusted gross income (phasing out incrementally as income rises above that level) as well as a number of tax credits and policies to assist businesses through the emergency (National Conference of State Legislatures, 2020; Rifis et al 2021). Additional legislation passed in March 2021 extended pandemic unemployment benefits, revisions to the PPP program, and additional fiscal policy measures to support the economy. The cumulative total number of Long Islanders collecting unemployment by the end of 2020 stood at 323,000, and a cumulative total of $1.89 billion in benefits paid.

During the first quarter of 2020, there were 107,451 private establishments on LI. It is too early to say what the impact of the pandemic shutdown has been on them, though obviously, a number of these firms may not have survived two or more

months of closure, as well as operating at reduced capacity as a result of social distancing rules that are now in place. Over 65,000 firms on LI took advantage of the PPP.

Figure 1. Long Island Sectoral Employment 2000-2020
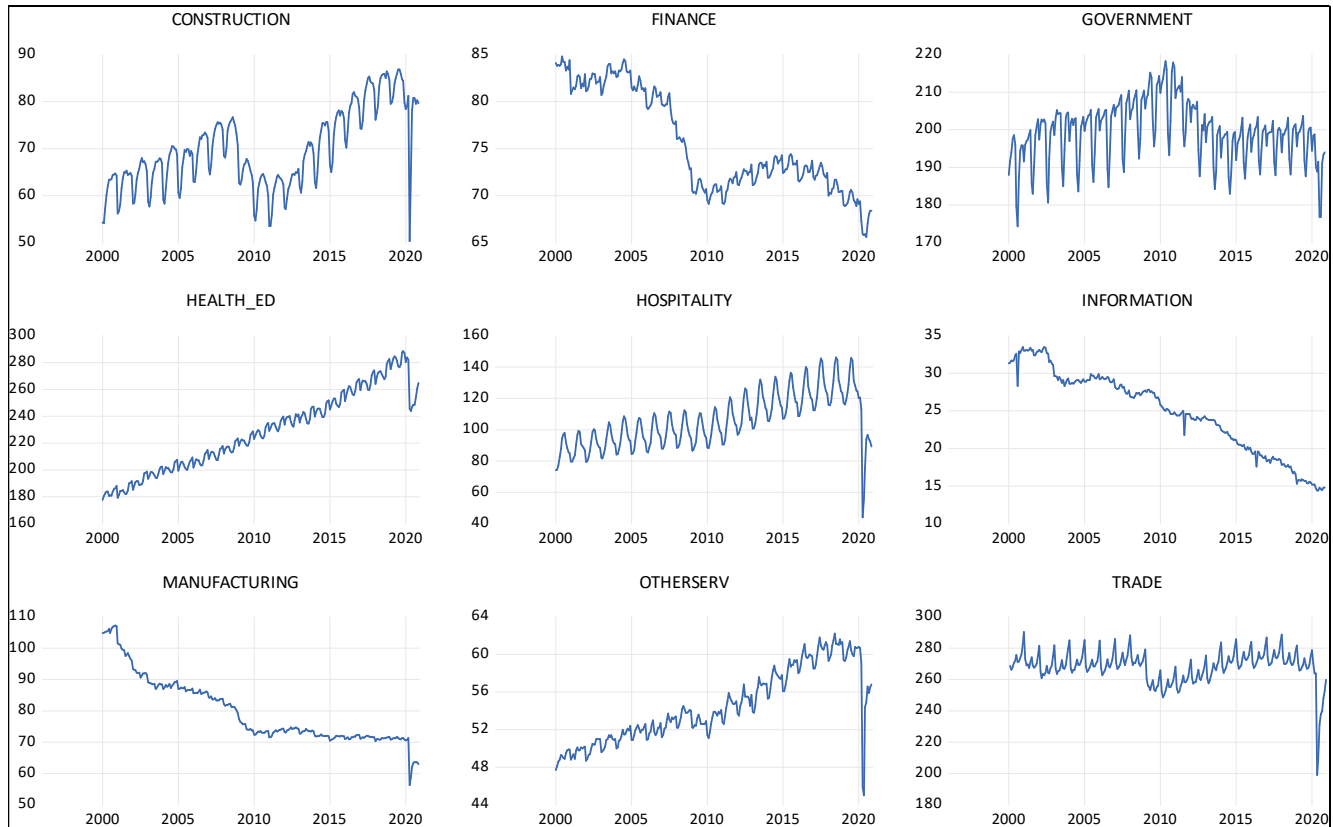
The composition of employment on LI has been changing over time, and there is the possibility that the lingering impacts of the shutdown could accelerate already preexisting trends such as the secular decline in manufacturing in the region from 12.6 percent of total employment to below 9 percent in 1999, and to 5.2 percent in January of 2020. Other sectors such as retail trade which while declining, have declined at a much slower rate having gone from 13.12 percent in 1990 to 11.7 percent in January of 2020, are now more threatened by the online retail competition that has flourished throughout the Pandemic shutdown.

Preliminary Analysis of Long Island

The impact of Covid-19 on the region is analyzed using both ordinary least squares and a VAR. This is very preliminary analysis and utilizes a simple structure in which endogenous variables such as employment, local labor force, and state sales tax are driven by exogenous variables, real US GDP, and two dummy variables, one for Covid-19, and the other for federal Covid-19 policy (CARES Act). The analysis is conducted using monthly data collected from the Bureau of Labor Statistics, Bureau of Economic Analysis, New York State Department of Taxation, and HIS Markit for the period of 2000-01 to 2020-12. Results of the analysis are presented below (Tables 3-5).

Both the OLS and VAR regressions show that the Covid-19 shutdown did have significant impact upon the region's employment at both the total and sectoral levels. The negative coefficient on the CARES dummy suggests that extended unemployment benefits, PPP loans and other governmental support programs did not necessarily maintain employment levels. This support did appear to positively impact NY State sales tax revenues and possibly lead individuals into the labor market, even while unemployment kept rising. The results are only preliminary and do not fully account for stationarity issues or other problems with the data. There is still more work to be completed on the analysis.

Table 3: OLS regression results – Total and Sectoral Employment

	Nonfarm	T-stat	Construct	T-stat	Finance	T-stat	Gov't	T-stat	Hlth/Ed	T-stat
USGDPR	0.297	17.35	0.784	11.73	-0.487	-18.71	0.003	0.08	1.145	67.73
COVID	-0.066	-3.92	0.018	1.09	-0.029	-3.62	-0.047	-2.84	-0.042	-1.60
CARES	-0.083	-2.83	-0.126	-1.92	-0.059	-7.25	-0.021	-1.67	0.007	0.43
C	4.272	25.77	-3.344	-5.18	9.038	35.57	5.270	16.60	-5.647	-34.26
Adj R^2	0.751		0.539		0.670		0.059		0.949	

Estimated in log form, 1/2000-12/2020

Table 4: OLS regression results – Sectoral Employment

	Hospitality	T-stat	Inform	T-stat	Man.	T-stat	OthServ	T-stat	Trade	T-stat
USGDPR	1.175	14.78	-1.894	-23.34	-0.963	-29.23	0.616	49.71	1.84	67.73
COVID	-0.278	-5.34	-0.195	-12.55	-0.045	-1.72	-0.056	-5.76	-5.84	-1.60
CARES	-0.332	-2.47	-0.127	-3.43	-0.135	-3.57	-0.097	-6.81	-4.57	0.43
C	-6.708	-8.72	21.513	27.38	13.686	42.98	-1.962	-16.37	28.97	-34.26
Adj R^2	0.710		0.930		0.802		0.911		0.384	

Estimated in log form, 1/2000-12/2020

Table 5: VAR Estimation: Total Nonfarm employment, Labor Force and State Sales tax

	Nonfarm	LabForce	Sales Tax
Nonfarm(-1)	0.67	0.02	1.25
	[10.7873]	[0.66285]	[2.59814]
Nonfarm(-2)	-0.21	-0.11	0.20
	[-3.59083]	[-3.34732]	[0.44707]
Labforce(-1)	-0.22	1.00	-5.23
	[-2.02419]	[16.3462]	[-6.28317]
Labforce(-2)	-0.02	-0.24	4.06
	[-0.15629]	[-3.80655]	[4.75472]
Sales Tax(-1)	-0.04	-0.01	-0.53
	[-5.60821]	[-1.87105]	[-10.5048]
Sales Tax(-2)	0.00	-0.01	-0.56
	[0.35153]	[-1.37643]	[-10.2488]
C	5.35	3.55	7.73
	[6.43192]	[7.50053]	[1.19612]
USGDPR	0.24	0.07	2.80
	[10.3184]	[5.47418]	[15.6294]
CARES	-0.05	0.03	0.12
	[-4.95483]	[4.32049]	[1.37891]
Covid-19	-0.03	-0.02	0.07
	[-4.17664]	[-5.36462]	[1.05981]
adj R^2	0.85	0.81	0.72
F-stat	161.37	125.61	73.59
Log likelihood	1722.6	1722.6	1722.6

Estimated in log form, 1/2000-12/2020

Conclusions

A disaster may have long run impact on the regional economy. While certainly not limited to these effects, the principal long run consequences of disaster are 1) permanent changes in employment and income, 2) acceleration of preexisting economic trends, and 3) changes in growth and development.

The Covid-19 Pandemic has had tremendous impact on LI's economy over the past 11 months. It is still hard to predict the path of the economy at this point, and much depends on how quickly the public health component of the pandemic is resolved. A more comprehensive and full analysis of the region's economy is planned in the future.

References

Aliyev F, Mursalli N (2020) Black Swans of the World: New Name of Old Entity. 55th International Scientific Conference on Economic and Social Development, Baku, June 18-19, 2020

Babuna P, Yang X, Gyilbag A, Abra Awudi D, Ngmenbelle D, Dehui B (2020) The Impact of COVID-19 on the Insurance Industry. International Journal of Environmental Research and Public Health 17, 5766; doi:10.3390/ijerph17165766

Candau F (2008) Entrepreneurs' Location Choice and Public Policies: A Survey of the New Economic Geography. Journal of Economic Surveys 22(5): 909-952

Chandra F, Christensen J (2017) Preparing for Pandemic Influenza: The Global 1918 Influenza Pandemic and the Role of World Historical Information. Journal of World Historical Information Volume 3-4(1) (2016-2017) | ISSN 2169-0812

Chernick H, Copeland D, Reschovsky A (2020) The Fiscal Effects of the Covid-19 Pandemic on Cities: an Initial Assessment. National Tax Journal 73 (3): 699–732

Clay K, Lewis J, Severni E (2018) Pollution, Infectious Disease, and Mortality: Evidence from the 1918 Spanish Influenza Pandemic. The Journal of Economic History 78(4): 1179-1209

Empire State Development (2020) Guidance on Executive Order 202.6. New York State Empire State Development webpage, found at https://esd.ny.gov/guidance-executive-order-2026

Fezzi C, Fanghella V (2020) Real-Time Estimation of the Short-Run Impact of COVID-19 on Economic Activity Using Electricity Market Data. Environmental and Resource Economics 76: 885–900

Fujita M, Krugman P (2004) The New Economic Geography: Past, Present, and the Future. Papers in Regional Science 83: 139-164

Fujita M, Thisse J (2009) New Economic Geography: An Appraisal on the occasion of Paul Krugman's 2008 Nobel Prize in Economic Sciences. Regional Science and Urban Economics 39: 109-119

Kelso J.K, Halder N, Postma MJ, Milne GJ (2013) Economic analysis of pandemic influenza mitigation strategies for five pandemic severity categories. Public Health 13: 211. http://www.biomedcentral.com/1471-2458/13/211

Keogh-Brown MR, Smith RD, Edmunds JW, Beutels P (2010) The macroeconomic impact of pandemic influenza: estimates from models of the United Kingdom, France, Belgium and The Netherlands. European Journal of Health Economics 11:543–554

Lenzen et al (2020) Global Socio-Economic Losses and Environmental Gains from the Coronavirus Pandemic. Plos One 15(7), e0235654

Mitra, AK, Payton M, Kabir N, Whitehead A, Ragland KN, Brown A (2020) Potential Years of Life Lost Due to COVID-19 in the United States, Italy, and Germany: An Old Formula with Newer Ideas. International Journal of Environmental Research and Public Health 17, 4392; doi:10.3390/ijerph17124392

National Conference of State Legislatures (2020) Covid-19 Relief Bill: What it means for States. www.ncsl.org.

Overman H, Rice P, Venables AJ (2007) Economic Linkages across Space. CEP Discussion Paper No 805. London: Center for Economic Performance, London School of Economics and Political Science

Redding SJ (2009) Economic Geography: A Review of the Theoretical and Empirical Literature. CEP Discussion Paper No 904, London: Center for Economic Performance, London School of Economics and Political Science

Rifis JB, Merrill KM, Johnson KA, Hatahet ZS (2021) Federal COVID Relief Bill passed by Congress. National Law Review 11(17). https://www.natlawreview.com/article/federal-covid-relief-bill-passed-congress-december-2020

Rosenthal CL, Kaur A, Levin MH (2020) Tax Provisions of New York State's 2020/21 Budget and COVID-19 Due Date Extensions. The CPA Journal (May): 56-57

State of New York (2020) NY Forward: A Guide to Reopening New York and Building Back Better. New York State website, https://forward.ny.gov/

PARKER
COLLEGE OF BUSINESS
GEORGIA SOUTHERN UNIVERSITY

Department of Economics
Department of Finance

11935 Abercorn Street
Savannah, GA 31419