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NATIONAL ASSOCIATION OF BUSINESS, ECONOMICS AND TECHNOLOGY (NABET)

PROCEEDINGS of the 44th ANNUAL MEETING

Editors' Page

Throughout the 44-year history of the NABET/APUBEF Conference, we have striven to compile and publish the authors' papers which were presented at each of the respective conferences. Since 2013, the Proceedings has been upgraded to peer-reviewed status. Throughout the history of the NABET/APUBEF Proceedings, we have benefited from the services performed by an exceptional group of reviewers and editors.

For the 2021 Conference Proceedings, two professors and the editors participated in the peer-review process. Each of the reviewers worked diligently at the task of meticulously reviewing the various scholarly works that are presented in this Proceedings publication.

The editors acknowledge the dedication, hard work and the excellent result in which the reviewers' efforts resulted. The reviewers of the 2021 NABET Peer-Reviewed Conference Proceedings are:

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INTRODUCTION

The National Association of Business, Economics and Technology is in its forty-fourth year of existence. It was originally known as the Association of Pennsylvania University Business and Economics Faculty. It was founded by a group of economics and business professors from the fourteen state universities comprising the Pennsylvania System of Higher Education. Their goal was to provide a platform for sharing and encouraging scholarly work among the business faculty of the fourteen state universities. As a result of their efforts, the organization has grown and has sponsored an academic conference each year for the past 44 years.

In 2006 NABET became regional in scope and has become national in scope since 2019. At the 44th Annual Meeting the scholarly work of authors from eight states, and the countries of Germany and the Netherlands representing several colleges and universities were presented.

At NABET, we encourage conference presenters to complete their papers and submit them for publication for this peer-reviewed Proceedings publication. Of the 80 papers and workshops presented at the 44th Annual Meeting, the following pages contain those papers that were completed by the authors and submitted to the Proceedings editors. Each paper has gone through a thorough review/edit process. *The Official Conference Program* of the 44th Annual Meeting including the abstracts of each paper that was presented at the conference is also included.

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THE NEW REVENUE RECOGNITION STANDARD AND THE STOCK PRICE REACTION

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ABSTRACT

This paper investigates whether abnormal returns exist around the announcement of changes in accounting principles (The New Revenue Recognition Standard). On May 28, 2014, The Financial Accounting Standards Board (FASB) and The International Accounting Standards Board (IASB) issued new guidance for companies recognizing revenue in contracts with customers. *Accounting Standard Update (ASU) No. 2014-09, Revenue from Contracts with Customers (Topic 606).* When updates are issued,the goal is to improve financial reporting for investors and other users of financial statements. Understanding the elements of financial statements (including revenues) is imperative to analyzing the financial strength of business entities and making investment decisions. We analyzed the impact of the Announcement of the New Revenue Recognition Standard (henceforth NRRS) and the Stock Price Reaction. *Accounting Standard Update (ASU) No. 2014-09, Revenue from Contracts with Customers (Topic 606).* Earlier research has shown that announcement events related to stock-generated investor reactions tend to affect the stock prices of the companies that are involved in the transactions. Our sample consisted of the 30 Companies from The Dow Jones Industrial Average. We first identified the announcement or event date, which was on May 28, 2014 and then utilize the Event- Study methodology Eventus, from the Wharton Research Database (WRDS), to test for the presence of abnormal returns around the event dates. Based on our findings, our results showed a statistically significant of 4.32% Mean Cumulative Abnormal Returns (CAR) thirty days before the announcement. This indicated that Investors were optimistic about the announcement of NRRS. Investors felt that NRRS improved transparency and earnings in the Financial Statements and were willing to pay higher prices. On the contrary, the results showed a significant negative Cumulative Abnormal Return (CAR) of -0.29%, from 1 day before the announcement date up to the announcement date, which could be due to companies adjusting to the announcement of NRRS.

INTRODUCTION

On May 28, 2014 a new guidance on recognizing revenue in contracts with customers was implemented by The Financial Accounting Standards Board (FASB) and The International Accounting Standards Board (IASB). *Accounting Standard Update (ASU) No. 2014-09, Revenue from Contracts with Customers (Topic 606).* FASB (Financial Accounting Standards Board) institutes the financial accounting and financial reporting standards for public, private and not for profit companies that follow (GAAP) Generally Accepted Accounting Principles. The purpose of this new guidance is to improve important areas of financial reporting. Because different industries use different accounting methods for similar economic transactions.

The objective of NRRS is to bring forth guidance that is useful for reporting financial information that pertains to the amount, timing, nature and uncertainty of revenue from contracts with customers. This new guidance is important because recognizing revenues impacts companies and businesses that enter into contracts with its customers. The standards that are set forth by FASB (Financial Accounting Standards Board) are recognized as authoritative. And FASB (Financial Accounting Standards Board) implements the financial accounting reporting standards that are transparent for investors and other users of annual financial reports. On the date of the announcement, stock prices were significantly impacted by this event. Because investors measure a company's revenue and company's performance as a decision to invest. Investors are expected to receive adequate compensation for amounts invested and want to mitigate risks. Investors use strategic approaches to investing and maximize income and minimize losses. Having a valid contract is a must and key to safeguarding investors and markets. Overly aggressive accounting can distort a company's true financial condition and mislead investors (SEC,2009 August 4).

Hence, FASB adopted the 5-step model for revenue recognition to reduce the risk of revenue fraud and abuse. This study is important because it is designed to give Investors, Shareholders and Traders transparent information to make intelligent business decisions. This paper investigates the test for the presence of abnormal returns around the announcement date of NRRS. *Revenue from Contracts with Customers (Topic 606).*

In order to conduct our study, we have researched multiple articles covering revenue recognition, along with our own empirical investigations for a better understanding. The stock market has always been volatile, so we can expect to find interesting results.

LITERATURE REVIEW

The new Revenue Recognition Standard (NRRS) required public firms to comply with the new guidance for recognizing revenue in contracts with customers in financial reporting. Prior studies suggest that some accounting changes provoke a response from the stock market. In this study, we review prior research that examined accounting changes at the regulator level (for example, a FASB mandated change in accounting for operating leases) versus accounting changes at the firm level (for example, a corporation changes to an alternative method for depreciation.)

Earlier studies in accounting changes and their impact on the stock market showed mixed results. Lev (1979) examined the market reaction to a change in the accounting for the oil and gas industry that required oil and gas firms to account for cost not connected to successful drilling using the Success Exploration (SE) method (i.e., expense the costs in the current period and reduce net income) rather than the Full Costing (FC) method (e.g., capitalize all costs and allocate the costs over time) (Lev 1979). Lev (1979) reported that the possibility of the FASB changing from FC to SE, i.e., the FASB issued an Exposure Draft, resulted in a decline in the market of 4.5% in FC companies compared to 1.0% in SE companies. The author concluded, "This market reaction appears to be relevant to accounting policy makers" (Lev 1979).

Conversely, Vigeland (1981) did not find evidence of a market reaction to the change in accounting for research and development costs. In 1974, the FASB issued Financial Accounting Standards No. 2: *Accounting for Research and Development Costs* (SFAS No. 2) requiring research and development costs to be expensed in the current period, disclosed in the financial statements, and written off as prior period adjustments if costs were deferred (Vigeland, 1981). The author reasoned that investors did not change their expectations about management decisions due to SFAS No. 2 (Vigeland 1981) and therefore, the market did not react.

More recently, in a study examining SFAS 142-*Goodwill and Other Intangible Assets* concerning the reporting of goodwill for firms in mergers and acquisitions, Stunda (2018) concluded that the accounting change for reporting goodwill—eliminating goodwill amortization—had a negative effect on the acquiring firm stock prices when the firm recorded goodwill.

Milian and Lee (2021) examined the market response to Accounting Standards Codification® (ASC) 842-*Leases*, which effectively eliminates the off-balance sheet treatment of operating leases, moving the leases from the notes, which are an integral part of the financial statements to the face of the balance sheet in assets and liabilities sections. The authors found equity investors reacted to the accounting change, although efficient market theory would suggest investors adjusted the financial statements for the operating lease information that was disclosed in the notes to the financial statements.

Although results of prior studies are mixed, we expect positive abnormal returns for NRRS because increasing consistency among firms in all industries improves the quality of reporting overall. Unlike the studies referenced, NRRS will be more widely applied because it is not industry specific. Therefore, we hypothesize that the stock market will show positive abnormal returns for the time period surrounding the announcement of NRRS.

Murphy and Tysiac(2015) suggest that there were companies that were in favor of the changes made by the International Accounting Standards Board (IASB), but made sure to suggest that the changes be pushed back a year for companies to have more time to get acclimated and settle into the new standard. (Add reference). According to Murphy and Tysiac's article, when interviewing with a CPA, they mention that if the principles differ between the

US. GAAP and IASB then companies will have to incur significant costs by using two different systems to account for transactions multiple ways, however, the interviewee expressed their enthusiasm for the simplicity the new standard would bring about especially within companies that have affiliates (Murphy and Tysiac, 2015).

In a study performed by Khalilov (2020) in Uzbekistan, he noted that "step one through five of the new IFRS 15 model accommodated the groundwork for the correct interpretation of the contractual rights and obligations and was the main criterion for revenue recognition in construction organizations" (Khalilov,2020). Khalilov's research draws insight toward how the construction industry in Uzbekistan is set to benefit from the changes by the increase of volume of foreign investors and sees an opportunity for expansion to access a global clientele. Findings suggest that even though the IFRS 15 model will provide transparency for investors to have access to the necessary financial information, contract modification in the construction industry specifically, will be undergoing some major changes and therefore, it could be normal to "consider changes to construction contracts as generally incomplete" (Khalilov 2020).

In an article by Kate Burgess for the Financial Times UK (2019), a company called Utility wise stock price quickly dropped 99.25% after the company failed to publish their full year numbers twice. This company was a contractual based company and their brokers had always overestimatedtheir profits from specific transactions. When the new standard came about, they failed to delivertheir financials and then came their demise. Based on most of our literature findings, companies that are contractually based had the most challenging time in ensuring they followed the IFRS 15 model to ensure transparency.

In an article by Jonathon Ford (2018), a company named Carillion had to rehash contracts that included substantial amounts of profit they received, and this ended setting them back 6 years' worth of data on dividends upon review and as a result they did not recover from this (Ford, 2018).The rest of the paper will contain sample & methodology, results, and finally conclusion.

Event Study: An event study is a statistical method of an empirical investigation of the relationship between security prices and economic events (Dyckman et al., 1984). Most event studies have focused on the behavior of share prices in order to test whether their stochastic behavior is affected by the disclosure of firm-specific events. Furthermore, incorporating context, the usefulness of events studies arises from the fact that the magnitude of abnormal performance at the time of an event provides a measure of the unanticipated impact of this type of event on the wealth of the firms' claimholders (Kothari and Warner 2006).

EMPIRICAL MODEL

Methodology:

This study employs a standard event study methodology, using Eventus from WRDS and we fit a standard market model to measure normal performance:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it,} \qquad \text{where } E(\varepsilon_{it}) = 0 \text{ and } \text{var}(\varepsilon_{it}) = \sigma^2_{\varepsilon t} \qquad 1$$

Each sample calendar date is converted to event time by defining the date of the NRRS announcement date (and the implementation date) as event date 0. So, for the announcement date, event date 0 is the same trading day. The regression coefficients α_i and β_i are estimated in an ordinary least squares (OLS) regression during the estimation period one year (255 trading days) prior to the event period (event days -300 through -46). The event period consists of 61 trading days centered on NRRS announcement date (-30 through +30). We define four event windows based on the event date, [-30,-2], [-1, 0], [+1, +2] and [+3, +30]. As proxy for the return for the market portfolio R_{mt} , both the CRSP value weighted index and the CRSP equal weighted index are used.

Under standard assumptions, OLS is a consistent estimation procedure for the market model parameters. Under the assumption that asset returns are jointly multivariate normal and independently and identically distributed (iid), OLS is also efficient. The prediction errors, $PE_{i\tau}$, which represent abnormal returns, are simply the OLS residuals, $\hat{\varepsilon}_{it}$.

$$PE_{i\tau} \equiv \hat{\varepsilon}_{i\tau} = R_{i\tau} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt})$$

with

$$\hat{\sigma}^2_{\varepsilon t} = \frac{1}{255-2} \sum_{\tau=t-299}^{t-46} (R_{i\tau} - \hat{\alpha}_i - \hat{\beta}_i R_{m\tau})^2 \quad (3)$$

The prediction error, PE_{it} is used as an estimator of the abnormal return. In other words, the abnormal return is the residual term of the market model calculated on an out of sample basis. Let $AR_{i\tau}, \tau = t-30, t-29, \ldots t+29, t+30$ be the sample of 61 abnormal returns for firm i in the event window. Under the null hypothesis, conditional on the event window market returns, the abnormal returns will be jointly normally distributed with a zero conditional mean and conditional variance:

$AR_{i\tau} \sim N(0, \sigma^2(AR_{i\tau}))$

The conditional variance $\sigma^2(AR_{i\tau})$ has two components. The first component is the disturbance $\hat{\sigma}^2_{\varepsilon t}$ from (3), and the second component is additional variance due to sampling error in estimating the market model parameters α_i and β_i :

$$\sigma^2(AR_{it}) = \sigma^2_{\varepsilon\tau} + \frac{1}{255}[1 + \frac{(R_{m\tau} - \bar{R}_m)^2}{\hat{\sigma}^2_m}] \text{ where } \bar{R}_m = \frac{1}{255} \sum_{\tau=t-299}^{t-46} R_{m\tau} \quad (5)$$

Since the estimation window is large (255 trading days), I assume that the contribution of the second component to $\sigma^2(AR_{i\tau})$ is zero.

To draw inferences about the average price impact of an event, abnormal return observations have to be aggregated across securities and through time. Average abnormal returns AAR_τ are formed by aggregating abnormal returns $AR_{i\tau}$ for each event period $\tau = t-30, t-29, \ldots t+29, t+30$. Given N events (for our sample, $N = 147$),

$$AAR_\tau = \frac{1}{N} \sum_{i=1}^{N} AR_{i\tau} \quad (6)$$

Under the assumption that average abnormal returns are independent across securities, the asymptotic variance equals to

$$Var(AAR_\tau) = \frac{1}{N^2} \sum_{i=1}^{N} \sigma^2_{\varepsilon\tau} \quad (7)$$

The average abnormal returns are aggregated through time to give the cumulative average abnormal return,

$$CAAR_i(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} AAR_{i\tau} \quad (8)$$

Setting the covariance terms to be zero,

$$\text{var}(CAAR_i(\tau_1, \tau_2)) = \sum_{i=1}^{N} \text{var}(AAR_{i\tau}) \quad (9)$$

Hence $CAAR_i(\tau_1, \tau_2) \sim N(0, \text{var}(CAAR_i(\tau_1, \tau_2))$ (10)

This can be used to test the null hypothesis that the abnormal returns are zero.

The estimated variance of AAR_τ is

$$\hat{\sigma}^2_{AAR} = \frac{\sum_{\tau=t-299}^{t-46} (AAR_\tau - \overline{AAR})^2}{255-2} \text{ where } \overline{AAR} = \frac{\sum_{\tau=t-299}^{t-46} AAR_\tau}{255} \quad (11)$$

The portfolio test statistic for day τ in event time is

$$t = \frac{AAR_\tau}{\hat{\sigma}^2_{AAR}} \quad (12)$$

Assuming time series independence, the test statistic for $CAAR_i(\tau_1,\tau_2)$ is

$$t = \frac{CAAR_i(\tau_1,\tau_2)}{\sqrt{(\tau_2-\tau_1+1)}\hat{\sigma}_{AAR}} \tag{13}$$

The abnormal return estimators often have different variances across firms. A common way of addressing this problem is the standardized residual method (Patell, 1976). Define the *standardized abnormal return*, $SAR_{i\tau}$ as

$$SAR_{i\tau} = \frac{AR_{i\tau}}{\hat{\sigma}_{MLE_{i\tau}}} \tag{14}$$

Where

$$\hat{\sigma}_{MLE_{i\tau}} = \hat{\sigma}^2_{\varepsilon\tau}\left(1+\frac{1}{T}+\frac{(R_{m\tau}-\bar{R}_m)^2}{\sum_{\tau=t-299}^{t-46}(R_{m\tau}-\bar{R}_m)^2}\right) \tag{15}$$

Is the maximum likelihood estimate of the variance. Under the null hypothesis each $SAR_{i\tau}$ follows a Student's t distribution with T-2 degrees of freedom. Summing the $SAR_{i\tau}$ across the sample yields

$$ASAR_{i\tau} = \sum_{i=1}^{N} SAR_{i\tau} \text{ where } ASAR_{i\tau} \sim N(0,Q_\tau) \tag{16}$$

The Z-test statistic for the null hypothesis that $CAAR_i(\tau_1,\tau_2)=0$ is

$$Z(\tau_1,\tau_2) = \frac{1}{\sqrt{N}}\sum_{i=1}^{N} Z_i(\tau_1,\tau_2) \text{ where } Z_i(\tau_1,\tau_2) = \frac{1}{\sqrt{(\tau_2-\tau_1+1)\frac{T-2}{T-4}}}\sum_{\tau=\tau_1}^{\tau_2} SAR_{i\tau} \tag{17}$$

The two test statistics so far discussed use the variance estimate from the market model during the estimation period to estimate the variance of the abnormal return estimator. But frequently, events increase the variance of returns, so that the event period variance is greater than the estimation period variance. The portfolio test statistic for day t in event time is

$$t = \frac{AAR_\tau}{\hat{\sigma}_{AAR_\tau}/\sqrt{N}} \text{ where } \hat{\sigma}_{AAR_\tau} = \frac{1}{N-1}\sum_{i=1}^{N}(AR_{i\tau}-\frac{1}{N}\sum_{i=1}^{N}AR_{i\tau})^2 \tag{18}$$

We use the above equation to calculate *Adjusted-t*

We ran two Eventus Ordinary List Squares (OLS) Regression Models: the New Revenue Recognition Standard **announcement date** (May 28, 2014) and **implementation date** (various dates in 2017, 2018, and 2019). **We** utilized CRSP (Center for Research in Security Prices) Equally Weighted for the benchmark and market indices. Our sample consisted of the 30 companies in the Dow Jones Industrial Average. Using quantitative analysis of the Cumulative Abnormal Returns (CAR) above or below equally weighted market index, we analyzed stock returns to ascertain if there were significant abnormal returns.

We used four window periods surrounding the announcement date and implementation date to determine whether there are indications that NRRS, an accounting standard change, resulted in abnormal returns for our sample. The four window periods are: 1. thirty days before the announcement to two days before the announcement (-30, -2); 2. one day before the announcement and the day of the announcement (-1, 0); 3. one day after the announcement to two days after the announcement (+1, +2), and 4. three days after the announcement up to thirty days after (+3, +30).

RESULTS

We ran two different Eventus Ordinary List Squares (OLS) Regression Models around the announcement date. In one model we used the **announcement date** of The New Revenue Recognition Standard. In the second model we used the **implementation date**of The New Revenue Recognition Standard. We utilized the CRSP Equally Weighted (The Center for Research in Security Prices)as a benchmark and market indices. We are testing the 30 companies from The

Dow Jones Industrial Average and if these companies make a statistical significance. Using quantitative analysis of CAR (Cumulative Abnormal Returns) above or below equally weighted market index. The results for different days before and after the announcement of The New Revenue RecognitionStandard dates are shown below in Table 1 and Table 2.

Table 1 shows the results of the Announcement Date using Eventus (Wharton Research Data Service (WRDS)). We investigated four windows periods for the announcement date. During the first window of time the results showed that thirty days before the announcement until two days before the announcement (-30,-2) a Mean CAR (Cumulative Abnormal Return) of 4.32% indicatinga high statistical significance. This indicates that investors were confident and optimistic about The New Revenue Recognition Standard. This also indicated improved transparency for investors in financial reporting. Additionally, because investors anticipated higher earnings and they were willing to pay higher prices. During the second window of time the results showed that one day before the announcement until the day of the announcement (-1, 0) a Mean CAR (Cumulative Abnormal Return) of negative - 0.29% which is non- significant signaling small implementations of market corrections. During the third window of time the results showed that one day after the announcement to two days after the announcement (+1,+2) a Mean CAR (Cumulative Abnormal Return) of 0.65% which is significant indicating continued optimism from investors about The New Revenue Recognition Standard. And Finally, the fourth window of time showed that three days after the announcement up to thirty days after (+3,+30) a Mean CAR (Cumulative Abnormal Return) of 0.08% non- significant. This implies that the market had already integrated The New Revenue Recognition Standard and no more above and beyond the market return is possible, after the seconds days of the announcement.

The New Revenue Recognition Implementation date results are presented in Table 2 for the 30 companies in the study. We ran a second OLS for the four window time periods (-30,-2), (-1, 0), (+1,+2), and (+3,+30) respectively. We used the before and after dates for the implementation period. And found that none of the CAR (Cumulative Abnormal Returns) are of statistical significance. This comes as no surprise given the announcement date was on May 28, 2014, and the implementation dates were in 2017,2018 and 2019 respectively. Hence, investors had already incorporated the New Revenue Recognition Standard into the decision-making mechanisms three or four years ago. Hence, there was no statistical significance in the stock returns of the 30 companies in The Dow Jones Industrial Average as a result of the implementation date of The New Revenue Recognition Standard.

CONCLUSION

In this paper we investigated whether abnormal returns existed around the announcement date and the implementation date of the New Revenue Recognition Standard. Our sample consisted of the 30 Companies of the Dow Jones Industrial Average. We focused on the announcement date +and implementation dates for The New Revenue Recognition Standard. The announcement date of The New Revenue Recognition occurred on May 28, 2014. The original sample data were from companies that had implementation dates ranging from 2017 to 2019. Our research efforts consisted of running an OLS Regression Model around the announcement date and around the implementation date for The New Revenue Recognition Standard. We ran two different linear regression models using Eventus from the WRDS while accessing data from the SEC EDGAR (Securities Exchange Commission database).We observed 30 days before and 30 days after the announcement date. Our results of the announcement date showed positive andhighly significant CAR before the announcement date. For thirty days up to two days before the announcement the CAR is 4.32 percent. As a result of these findings, we determined investors were optimistic about The New Revenue Recognition Standard. And anticipated transparency in reporting. One day before the announcement up to the day of the announcement the CAR showed a non-significance of -0.29 percent. This was an indication of the market already incorporated the new information.

In Conclusion, The New Revenue Recognition offers investors peace of mind when it comes to investing by eliminating inconsistencies and weaknesses in financial reporting. The New Revenue Recognition Standard provides a better understanding and brings forth transparency to financial reporting. As a result, investors can make informed decisions. The uniformity of Revenue Recognition is key in for comparisons, it is important to test the NRRS in different samples and different times in the future as well.

Table 1. Market Model Abnormal Returns, Equally Weighted Index
Announcement Date

Days	N	Mean Cumulative Abnormal Return	Precision Weighted CAAR	Positive: Negative	Uncorrected Patell Z	p-value	Portfolio Time-Series (CDA) t	p-value	Generalized Sign Z	p-value
(-30,-2)	29	4.32%	4.33%	25:4>>>	4.260	<.0001	2.241	0.0250	4.033	<.0001
(-1,0)	29	-0.29%	-0.31%	10:19	-1.154	0.2484	-0.572	0.5675	-1.540	0.1236
(+1,+2)	29	0.65%	0.65%	25:4>>>	2.422	0.0155	1.281	0.2003	4.033	<.0001
(+3,+30)	29	0.08%	0.20%	13:16	0.205	0.8378	0.042	0.9665	-0.425	0.6705

The symbols (,<,<<,<<< or),>,>>,>>> show the direction and significance of a genericone-tail generalized sign test at the 0.10, 0.05, 0.01 and 0.001 levels, respectively.

Table 2. Market Model Abnormal Returns, Equally Weighted Index
Implementation Date

Days	N	Mean Cumulative Abnormal Return	Precision Weighted CAAR	Uncorrected Positive: Negative	Patell Z	p-value	Portfolio Time-Series (CDA) t	p-value	Generalized Sign Z	p-value
(-30,-2)	27	1.61%	1.49%	14:13	1.443	0.1490	1.193	0.2327	0.299	0.7650
(-1,0)	27	-0.51%	-0.54%	10:17	-1.983	0.0473	-1.427	0.1536	-1.241	0.2146
(+1,+2)	27	-0.22%	-0.22%	12:15	-0.800	0.4239	-0.612	0.5403	-0.471	0.6376
(+3,+30)	27	-2.27%	-2.50%	10:17	-2.457	0.0140	-1.714	0.0865	-1.241	0.2146

The symbols (,<,<<,<<< or),>,>>,>>> show the direction and significance of a generic one-tail generalized sign test at the 0.10, 0.05, 0.01 and 0.001 levels, respectively.

Figure 1.

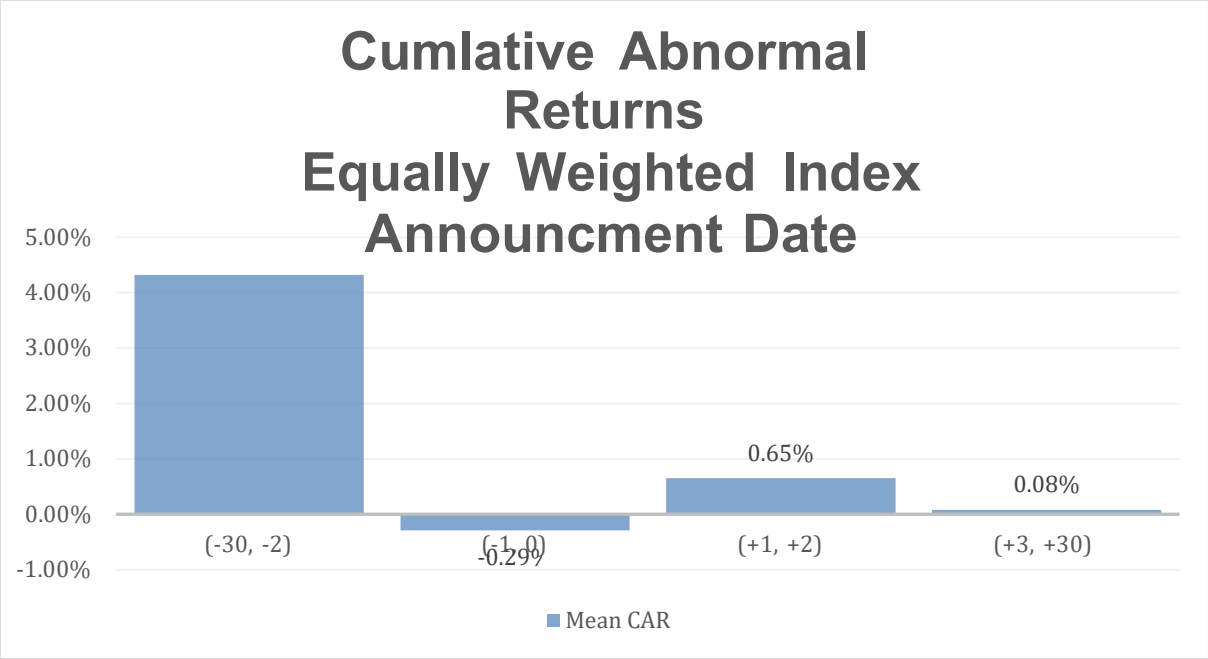
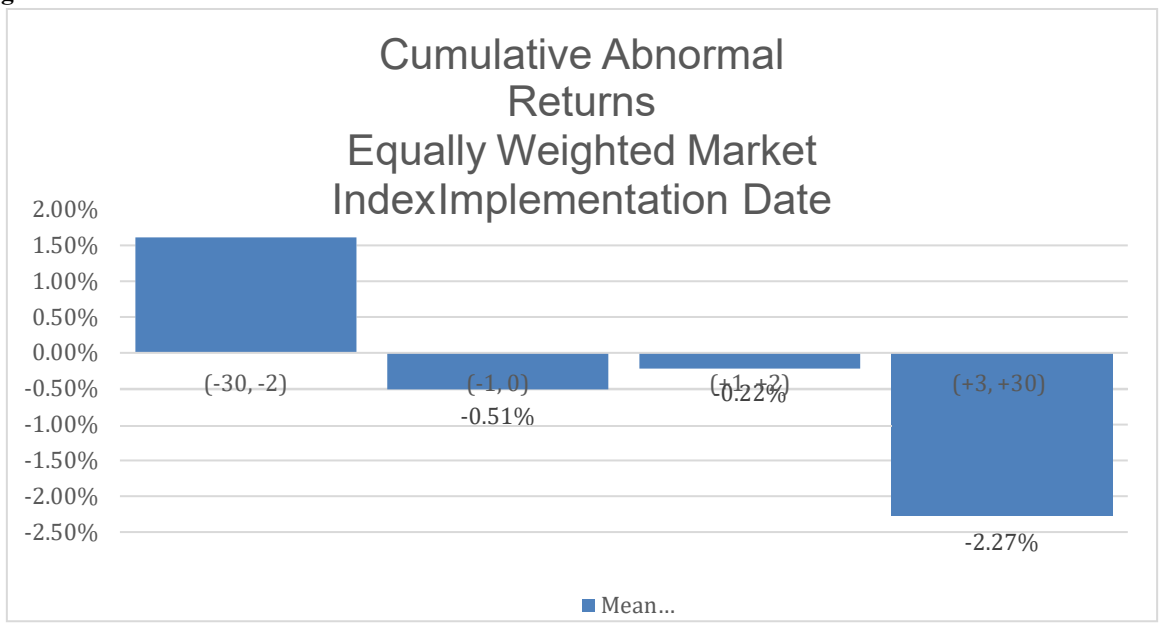


Figure 2.



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THE DETERMINANTS AND EVOLUTION OF CORPORATE OWNERSHIP STRUCTURE: EVIDENCE FROM SPINOFFS

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ABSTRACT

This paper examines the determinants of ownership structure from a sample of corporate spinoffs. Spinoff offers an interesting empirical design to study corporate ownership because following the pro-rata distribution of shares from the new publicly traded spunoff firm to existing parent shareholders, both parent and spunoff firms have an identical ownership structure. By tracking the evolution of ownership structures over 10 years of these two sets of firms that start at the same point, I find that firms adjust their ownership structures over time to fit their firm characteristics. More specifically, larger firms with high leverage, low free cash flow, high tangibility, and low research and development expenses (R&D) tend to have lower managerial ownership. Larger firms with low leverage often have higher level of institutional ownership.

INTRODUCTION

The important effect of ownership structure on corporate performance and policies has been widely studied in the finance literature. Researchers find that ownership structure significantly affects a firm's value (Morck, Shleifer, and Vishny, 1988; McConnell and Servaes, 1990) as well as corporate policies including investment (Cho, 1998), executive turnover and compensation (Denis, Denis and Sarin, 1997; Hartzell and Starks, 2003), and payout policies (Grinstein and Michaely, 2005). However, the fundamental question of how firms determine their ownership structures remains debatable. On the one hand, some researchers argue that ownership structure is endogenously determined by the firm's contracting environment and is unrelated to a firm's performance (Demsetz and Lehn, 1985; Himmelberg, Hubbard, and Palia, 1999). On the other hand, several researchers find that ownership structure is strongly influenced by investors' preference for risk and reward, especially with institutional investors, such as preference for firms with large liquid stocks (Gompers and Metricks, 2001), dividend-paying firms (Grinstein and Michaely, 2005), and firms with good governance (Chung and Zhang, 2011).

This paper attempts to shed light on the determinants of corporate ownership by investigating the evolution of ownership structure after corporate spinoffs. A spinoff is one of the most common types of asset divestitures in which it creates a new independent, public firm by separating a subsidiary from a parent firm. A pure spinoff transaction involves a pro-rata distribution of the subsidiary's shares to the parent firm's existing shareholders. Due to the nature of the transaction, spunoff firms and parent firms have identical ownership structures at the time of the pro-rata distribution. As a result, a pure spinoff offers an interesting empirical setting where we can observe two firms that start at the same point for the ownership structure but might diverge over time depending on their firms' characteristics, managers' preferences, or some other reasons. By utilizing this unique design of pure spinoff transactions, this paper examines some of the potential firm characteristics that determine corporate ownership structure and how the ownership structure evolves over time.

In addition, a major limitation of the existing research on ownership structure is that the ownership data is not standardized and readily available. To my knowledge, a popular data source on ownership, Compact Disclosure has the broadest coverage but contains many mistakes and biases including biases of overlaps and preferred shares as pointed out by Dlugosz, Fahlenbrach, Gompers and Metrick (2006). By hand-collecting ownership data directly from proxy statements of spunoff firms and their parent firms for 10 years following the spinoffs, I acquire a clean dataset to examine the determinants of corporate ownership.

By observing the ownership evolution of both spunoff and parent firms for 10 years after the spinoffs, I find that their ownership structures, including institutional ownership and managerial ownership components, are significantly different between spunoff firms and parent firms. I then explore the determinants of ownership structure in regression settings and find that firm size, leverage, free cash flow, tangibility and R&D are important firm characteristics for managerial ownership. Specifically, bigger firms with high leverage, low free cash flow, high tangibility, and low R&D tend to have lower level of managerial ownership. In addition, bigger firms with low leverage tend to have higher level of institutional ownership. Finally, parent firm's institutional ownership also has a significant impact on shaping the new public unit's firm institutional ownership in their early years.

This paper contributes to the literature on corporate ownership structure in two folds. First, this is the first paper to document the evolution of corporate ownership structure after spinoffs. Second, by utilizing the identical ownership position at the time of spinoffs of two sets of firms, this paper helps shed light on the determinants of corporate ownership structure over time.

The paper will proceed as follows: Section II summarizes the literature; Section III describes the data collection and descriptive statistics. Section IV provides empirical analyses on determinants of corporate ownership, then Section V concludes.

LITERATURE REVIEW ON CORPORATE OWNERSHIP

Before going into the data collection and analyses, the following section summarizes prior literature on corporate ownership, theoretical predictions, and existing evidence regarding the determinants of managerial and institutional ownership. It is also important to note that a big strand of the literature documents that legal environment, common-law based vs. civil law based countries, is the biggest determinant of ownership structure (Prowse, 1992; La Porta et al., 1998; Faccio and Lang, 2002), however this paper only focuses on the determinants of corporate ownership within the U.S.

Managerial Ownership

The Effect of Managerial Ownership on Corporate Policies

Extant literature provides amble evidence of managerial ownership on firm performance, value, and policies. Most of this strand of literature is based on Jensen and Meckling (1976)'s agency theory, where high managerial ownership helps align managers' incentives with those of shareholders and reduces agency costs (Morck, Shleifer and Vishny, 1988; Stulz, 1988). Indeed, Lilienfeld-Toal et al. (2014) find that owner-CEOs are value increasing: they reduce empire building and run their firms more efficiently. However, both Morck et al. (1988) and McConnell and Servaes (1990) warn that the relationship between managerial ownership and firm value is not monotonic. When managers act on their own interests at the expense of the firm's shareholders, their entrenchments and associated agency costs lead to suboptimal corporate policies and can be detrimental to the firm (Jensen, 1986; Berger, Ofek and Yermack, 1997).

The Determinants of Managerial Ownership

Jensen and Meckling (1976) have fundamentally influenced the finance literature by their theory of the firm, in which they argue that, due to the separation between ownership and control, we often have agency problems or conflicts of interest between owners of the firm (shareholders) and managers. Therefore, we could expect firms with potentially high level of agency problem to have high managerial ownership. Specifically, firms with high free cash flow might have high level of insider ownership since free cash flow is one of the major sources of managers' discretionary spending (Jensen, 1986).

Moreover, free cash flow decreases with capital expenditures and leverage, therefore, firms with more capital expenditures and higher leverage are expected to have lower insider ownership. Similarly, firms with high ratio of fixed assets (or high tangibility) might have low managerial ownership since there is less scope for the managers to expropriate in firms with more hard assets (Jensen, 1986). Finally, bigger firms usually have more publicity, making it easier to attract public investors, including institutional investors (for investment or monitoring purposes). Thus, we could expect big firms to have diluted ownership or low level of managerial ownership.

As Myers and Majluf (1984) point out, managers often have superior information about the firm, so they would only dilute their holding when they can issue equity at an advantageous price. Under this explanation, firms with high information asymmetry would have high level of insider ownership. Particularly, larger firms who get more analyst and news coverage would have less information asymmetry problem and should have low managerial ownership. Firms with high information asymmetry problems, often characterized by high R&D, high growth (market-to-book), and high intangible assets (low tangibility) make it prohibitively expensive for managers to sell equity and therefore, are predicted to have higher level of managerial ownership.

Institutional Ownership

In their seminal paper, Jensen and Meckling (1976) emphasize that the agency problems arising from the separation of ownership and control are mainly due to the managerial owners' inadequate stakes in their firms. As a result, large shareholders can have more power and play a far more active role in corporate governance than dispersed individual investors due to their sizable equity ownership and incentives to monitor. In addition to the theoretical motivation, the surge of institutional investors in recent decades also inspires finance researchers to study and understand the behaviors of institutional investors. Blume and Keim (2012) stated that "Of the total market value of US common stocks of $1.4 trillion in 1980, institutions held $473 billion, or 34%. By 2010, the total market value of common stocks had increased to $17.1 trillion, and institutions had increased their holdings to $11.5 trillion, or 67% of all stocks." However, the literature thus far mostly focuses on the monitoring role of institutional investors and their effect on firm outcomes, rather than the determinants of institutional ownership.

The Effect of Institutional Ownership on Corporate Policies

With their large stakes in the firm, institutional investors have incentives and sufficient power to influence corporate policies and outcomes. Indeed, prior literature has provided abundant evidence that institutional investors help relieve agency costs by monitoring manager's behaviors, reducing executive compensations, influencing the merger outcomes, and overall have a considerably positive effect on firm's performance. More specifically, Cornett et al. (2007) document a significant positive relationship between a firm's operating performance and both the percent of institutional stock ownership and the number of institutional stockholders. Hartzell and Starks (2003) and Almazan, Hartzell, and Starks (2005) find that institutions reduce the level of executive compensation and increase the pay-for-performance sensitivity. Chen, Harford and Li (2007) show that the presence of institutional investors help improve post-merger performance and reduce the likelihood of bad acquisitions. In addition, Brav et al. (2008) find that activism activities initiated by institutional investors (hedge funds) effectively reduce agency problems, increase payout, and improve firms' operating performance.

The Determinants of Institutional Ownership

Understanding that institutional investors can have a big impact on firms' policies and outcomes, some researchers are interested to figure out what firm characteristics can attract institutional investment in the first place. Falkenstein (1996) and Gompers and Metricks (2001) suggest that institutional investors have a strong demand for large and liquid stocks because of their liquidity and transaction-cost motives. Grinstein and Michaely (2005) find that institutions prefer stocks that pay dividends or repurchase shares, but institutions do not show any preference for firms that pay high dividends, inconsistent with the clientele effect. Moreover, Parrino, Sias and Starks (2003) show that institutions are attracted to companies with better managerial performance and abandon stocks around forced CEO turnover because they favor prudent securities.

In addition, using a comprehensive governance score which covers 50 governance factors, Chung and Zhang (2011) find that institutional investors prefer firms with good governance practices to meet fiduciary responsibility and to minimize monitoring and exit costs. Furthermore, Demsetz and Lehh (1985) find that ownership choices vary in the way consistent with the firm's contracting environment. More specifically, they find that ownership concentration is negatively correlated with firm size, while positively correlated with profit instability. They argue that firms with more volatile profitability are more difficult to monitor, thus require a higher level of institutional ownership to control managers' misbehaviors.

In summary, existing literature with different theories provide various predictions on the drivers of corporate ownership, including managerial and institutional ownership. Empirical research provides ample evidence on the important effect of ownership on corporate performance and policies, but the fundamental question of ownership determinants remains debatable. The next section describes my data collection process to examine corporate ownership determinants by utilizing the interesting empirical design of corporate spinoffs.

DATA COLLECTION AND SUMMARY STATISTICS

Data Collection

My initial sample comes from Securities Data Corporation (SDC) Mergers and Acquisition for the period from 1/1/1986 to 12/31/2005 with the *spinoff* flag for U.S. issuers, which yields 743 spinoff transactions. After exploratory analyses, I apply the following exclusions on my initial sample: any firm (either parents or units) in the financial or utility industries because they usually have special ownership structure due to regulations, private firms or limited partners where ownership data are not available, and firms with missing Compustat total assets variable (one of the main explanatory variables), which leaves my sample with 330 spinoff transactions.

Next, I manually check whether the spinoff is a pure spinoff. In a pure spinoff, parent firms use Form 10 filings to make their subsidiary/unit go public (not Form S-1 like a traditional IPO) and distribute in pro-rata basis all units' new shares to their existing shareholders. This unique feature of pure spinoffs provides an interesting empirical design to examine corporate ownership structure because the pro-rata distribution of all units' new shares to existing parent firms' shareholders creates two sets of firms with identical ownership structure right after spinoffs. These two sets of firms, parent and unit, might have very different firm characteristics, which might drive their diversion overtime in ownership structure. I refer to the subsidiaries that go public and get separated from the parent firms in spinoffs as spunoff firms or unit firms throughout the paper. Some examples of pure spinoffs included in my sample are Abbott Laboratories spunoff Hospira Inc in 2003; Kimberly-Clark Corp spunoff Neenah Paper Inc in 2004; and Grey Television Inc spunoff Triple Crown Media in 2005.

Note that there is another type of spin-off called two-stage spinoff in which parents launch a partial IPO for their units but sell less than 20% of shares to public investors. Then after a short period of time (usually less than 2 years) they distribute the remaining units' shares, which helps them qualify for a tax-free distribution to existing parent shareholders. I do not include this two-stage spinoff in my sample.

Finally, I hand-collect ownership data for parents and unit firms from 1 year to 10 years following their spinoffs directly from their proxy statements in U.S. Securities and Exchange Commission (SEC) for the period after 1996 and Thomson One for the period before 1996 (SEC does not consistently provide filings before 1996). All financial data is pulled from Compustat. Due to the limited ownership data, my final sample includes 100 spinoffs with 100-unit firms and 92 parent firms for a total of 1,210 firm-year observations. The number of parent firms is less than the unit firms because some conglomerate firms spunoff more than one subsidiary, or some unit firms have the same parents.

Summary Statistics

Table 1 provides the distribution over time of pure spin-off transactions. My sample has more firms in the earlier years in 1990s, but this does not mean spinoffs are not popular in recent years. According to Khorana (2011) corporate spin-off activities around the world had been increased at a steady pace from 2001 to 2011 as conglomerate firms navigated away from diversification. However, my sample excludes private firms and foreign firms in order to collect data on their ownership structures, therefore it might have significantly reduced my sample size.

Table 2 provides an overview of the ownership structures in unit firms (Panel A) and parent firms (Panel B). This table also offers the evolution of their ownership structures over time (for maximum of 10 years data collection). Please note that the number of observations in my ownership tables is changing over time due to the limited ownership data availability in early period (1985-1990). In addition, these observations are decreasing over time as units or parents get merged or go bankrupt.

The sample pooled means of institutional ownership over 10 years appear not much different between parents and units. However, it makes more sense to look at the ownership differences within each parent-unit pair, instead of the ownership averages in the full sample. Therefore, I create a new variable as the difference between parent's and unit's ownership. Now we can see a clear picture within each parent-unit pair in Table 3.

As shown in Table 3 Panel A, the differences in parent-unit managerial ownership are positive and significant over 10-year period indicating that spunoff firms have higher managerial ownership as compared to their parents (the mean difference is 4.64%, positive with t-test at 1% significance). Their managerial ownership difference does not seem to change much over time. One possible explanation for this higher level of managerial ownership in spunoff firms is that existing parent firms' managers and directors with their operational knowledge and expertise stay in the newly formed firm to help it get established. As documented by Feldman (2015), after corporate spinoffs, 60% of directors serve in both parent and unit firms, and 35% of their dual directors stay for at least 3 years.

In Table 3 Panel B, the differences in parent-unit institutional ownership are, on the other hand, negative and significant over 10-year period indicating that spunoff firms have lower institutional ownership percentages as compared to their parents and the difference magnitude is bigger than managerial level (the mean difference is -7.77% with t-test at 1% significance). Due to the nature of the spinoff events, it is the first time that spunoff firms become public entities, as compared to parent firms who already have a long history of operation. Parent firms are often well established and on average are larger than the spunoff firms as shown in Table 4.

Firm characteristics are summarized in Table 4 with spunoff firms in Panel A and parent firms in Panel B. All variables are defined in Appendix A. All financial data is collected from Compustat database.

Book Leverage $= \frac{DLTT+DLC}{AT}$
Following Denis and McKeon (2012), I calculate market leverage as:
Market Leverage $_{it} = \frac{DLTT+DLC}{DLTT+DLC+(PRCC*CSHO)}$

where *DLTT* is the amount of long-term debt, *DLC* is debt in current liabilities, including the portion of long-term debt due within one year, *AT* is total assets, *PRCC* is the year-end common share price, and *CSHO* is the year-end number of common shares outstanding. I use both book and market leverage in my analysis but since the results are qualitatively similar, I use the market leverage results for discussion. All continuous variables are winsorized at 1% and 99% to reduce possible effects of outliers.

As shown in Table 4, on average, parent firms are much bigger (in total assets and firm size, t-test significance at 1% level) than spunoff firms, consistent with previous literature that spinoff is one of popular divestiture methods for conglomerates to reverse mergers and unlock company value (Veld and Merkoulova, 2009; Khorana, 2011). Parent firms are often more profitable, hold more cash, have higher tangibility, and lower R&D expenses than spunoff firms, and they are usually in unrelated industries after spinoff transactions (29% in the sample are related vs. 71 % are unrelated). Again, this is consistent with prior literature on spinoff motivations, parent firms often want to refocus on their core business segments and separate out the unrelated subsidiaries in spinoffs (Powers, 2001; Khorana, 2011).

Now that we understand some descriptive statistics of parent and spunoff firms and their ownership structures, next section will examine the determinants of their managerial and institutional ownership compositions and explore the potential factors that lead to their differences in ownership structures over time.

EMPIRICAL ANALYSIS

Managerial Ownership

Table 5 presents the regressions on managerial ownership. I regress all firms' managerial ownership on different firm characteristics including firm size, free cash flow, tangibility, and leverage. The regression has the following specification for Column 1:

Managerial Ownership $_{it} = \alpha + \beta_1$ Firm Size $_{i,t-1} + \beta_2$ Free Cash Flow $_{i,t-1} + \beta_3$ Tangibility $_{i,t-1} + \beta_4$ Leverage $_{i,t-1} + \epsilon_{i,t}$

In Column 1, I include firm characteristics that have predicted signs under Jensen and Meckling (1976)'s agency theory as discussed in the previous section. As shown in Column 1, firm size is negatively and significantly related to managerial ownership, indicating that bigger firms tend to have lower managerial ownership, consistent with the dilution of ownership of large public companies. In addition, the coefficient of free cash flow is positive and significant, suggesting that firms with high free cash flow (often associated with more agency problems) tend to have

higher managerial ownership, again consistent with the free cash flow argument in Jensen (1986). Finally, both coefficients on tangibility and leverage are negative, as predicted, indicating that firms with high level of fixed assets and high debt make it more difficult for managers to expropriate and tend to have lower managerial ownership.

In Column 2, I add several other explanatory variables, including R&D expense and market-to-book based on the predictions under Myers and Majluf (1984)'s information asymmetry theory discussed in the previous section. The coefficient on R&D is positive and significant, while market-to-book is insignificant. The positive relation between managerial ownership and R&D expenses suggests that firms with high R&D tend to have higher managerial ownership, consistent with the argument that these firms often have high information asymmetry problem, making it difficult and expensive for managers to dilute their ownership. Firm size and tangibility have the same negative signs as in Column 1, so the directions of these relationships with managerial ownership are consistent; however, this may be explained by either agency theory or information asymmetry or both. This paper only aims to identify the determinants of ownership structure without trying to distinguish different theoretical explanations. Column 3 shows the full regression with all firm variables and their coefficient signs stay the same as the first 2 columns. Please note that I do not add free cash flow and R&D in the same regression because they are highly correlated. A full correlation table among firm characteristics is summarized in Appendix B.

Institutional Ownership

Table 6 presents the regressions on institutional ownership. I regress all firms' institutional ownership on different firm characteristics including firm size, leverage, free cash flow, and profit volatility. The regression has the following specification:

$$\text{Institutional Ownership}_{it} = \alpha + \beta_1 \text{ Firm Size}_{i,t-1} + \beta_2 \text{ Leverage}_{i,t-1} + \beta_3 \text{ Free Cash Flow}_{i,t-1} + \beta_4 \text{ Volatility}_{i,t-1} + \epsilon_{i,t}$$

Positive significant coefficient on firm size indicates that bigger firms tend to attract more institutional investors, consistent with the increase in publicity and analyst coverage of large public companies, and also in line with the agency theory in regard to monitoring (Jensen and Meckling, 1976). The positive correlation between firm size and institutional ownership is in line with the summary statistics shown in Table 3, parent firms are often larger in size and have higher institutional ownership than their spunoff firms. This finding is also consistent with existing literature on the incentives and power of institutional investors. With their sizable stakes in the firm, they have more incentives to monitor and benefit more from firm's performance improvement (Hartzell and Starks, 2003, Cornett et al., 2007).

In addition, the coefficient on leverage is negative and significant. Again, I use market leverage in my regressions, but the results with book leverage is quantitatively similar. This negative relationship between leverage and institutional ownership could be interpreted in at least two ways. First, leverage represents the debt financing while institutional ownership represents the equity financing in the firm's capital structure, therefore as one form of financing increases, the other decreases mathematically. Second, negative relationship between leverage and institutional ownership might suggest that institutional investors prefer lower leverage firms, which helps lower risk of bankruptcy in these firms. Both explanations can be plausible, but more importantly the results in Table 6 show that leverage is an important determinant of institutional ownership.

As discussed in the previous literature review section, Chung and Zhang (2011) suggest that institutional investors prefer firms with good governance, measured by free cash flow here (the reason is firms with good governance should have low agency problems including the free cash flow problem). Demsetz and Lehh (1985) argue that institutional investors prefer firms with low profit volatility (or high stability). However, the last two variables in Table 6, free cash flow and profit volatility are not significant for my sample.

In Table 7, I re-run the regression but only on spunoff firms' institutional ownership and include lagged parent's initial institutional ownership as an additional explanatory variable. The reason is that the unit's initial institutional ownership is inherited from the parent due to the pro-rata distribution of its new shares to existing parent shareholders, therefore parent's initial institutional ownership might have some influence in shaping up the unit's ownership structure. As seen in Column 1 Table 7, the coefficient of parent's institutional ownership lag by 1 year is positive and significant, with the magnitude is strongest among all explanatory variables with the first 4 lags. However, the significance and magnitude of parent's effects are gradually reduced and become insignificant in Column 6, indicating

that after 6 years, parent's initial institutional ownership no longer has an impact on the unit's institutional ownership, but it does have a significant impact in the early life of the unit's firm institutional investors.

CONCLUSION

This paper investigates the determinants of firm ownership structure by using a sample of pure spinoffs. Pure spinoff transaction offers a unique experimental design by creating two firms with identical ownership structure by pro-rata share distribution of new public unit firm to existing parent's shareholders. I find that ownership structures evolve over time to better fit a firm's characteristics, including firm size, leverage, tangibility, free cash flow, and R&D. More specifically, larger firms with more publicity often have higher institutional ownership and low managerial ownership. In addition, firms with high leverage often have low managerial ownership and low institutional ownership. Finally, firms with low tangibility, high agency problems as measured by free cash flow and high R&D expenses tend to have high managerial ownership.

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Table 1
Distribution of Pure Spinoff Sample for the Period 1986-2005

This table provides the distribution of my spinoff final sample during the data collection period 1986-2005. The initial spinoff sample is from Securities Data Corporation (SDC) Mergers and Acquisition. A pure spinoff is a corporate transaction where a firm's subsidiary goes public, separated from a parent firm, and all of its newly public shares are distributed in pro-rata basis to existing parent' shareholders. The final sample has 100 spinoffs with a total of 1,210 firm-year observations.

Year	N
1986	1
1987	3
1988	3
1989	1
1990	5
1991	2
1992	3
1993	7
1994	6
1995	12
1996	11
1997	7
1998	8
1999	6
2000	7
2001	2
2002	6
2003	7
2004	1
2005	2
Total	100

Table 2
The Evolution of Ownership Structure in Spinoffs over 10-Year Period

This table provides the ownership structures, including institutional and managerial ownership, of spunoff firms and parent firms from 1 to 10 years after their spinoffs. Panel A presents spunoff firms' ownership structures while Panel B presents parent firms' ownership structures. Number of observations is not the same every year due to the limitability of ownership data in SEC or Thomson One database before 1996. Numbers are shown as percentages.

Panel A: Ownership Structure in Spunoff Firms

		Managerial Ownership			**Institutional Ownership**		
Year After Spinoffs	N	Mean	Median	Std Dev	Mean	Median	Std Dev
1	69	11.81	4.70	14.11	48.10	48.90	22.83
2	95	11.80	4.76	13.06	50.51	55.52	21.96
3	94	14.18	5.07	14.33	52.89	56.88	26.77
4	87	12.93	5.39	13.38	54.01	59.85	27.13
5	72	12.67	5.99	13.67	56.95	65.69	27.39
6	72	12.19	6.20	14.64	61.66	66.52	25.26
7	68	12.69	5.62	15.61	60.19	69.76	28.14
8	59	12.01	5.70	15.14	63.69	69.24	27.24
9	52	11.68	5.83	15.91	62.27	69.34	26.96
10	44	12.71	4.95	15.30	63.14	67.91	28.99

Panel B: Ownership Structure in Parent Firms

		Managerial Ownership			**Institutional Ownership**		
Year After Spinoffs	N	Mean	Median	Std Dev	Mean	Median	Std Dev
1	67	12.73	7.55	14.07	40.00	37.63	20.65
2	87	11.91	6.05	13.90	51.00	51.63	23.14
3	81	11.53	5.40	15.93	53.99	58.11	24.38
4	66	9.82	4.45	14.63	56.79	62.37	26.01
5	57	9.42	4.01	15.39	60.46	65.26	21.11
6	58	10.42	4.45	15.95	58.12	65.09	22.60
7	50	9.92	4.52	16.67	56.10	61.93	25.62
8	44	9.54	4.20	16.98	56.38	61.80	24.97
9	40	9.82	3.98	17.61	59.94	63.83	23.90
10	39	10.59	3.90	18.23	61.66	68.20	24.63

Table 3
Differences in Ownership Structures between Parent-Unit Firms after Spinoffs

This table provides a summary of differences between ownership compositions between each parent-unit pair following their separations after spinoffs. Panel A summarizes the differences in Managerial Ownership and Panel B in Institutional Ownership. This table also includes the t-test results to check if the mean difference is significantly different from 0. Numbers are shown as percentages.

Panel A: Differences in Managerial Ownership

Year After Spinoffs	Mean	Stdev
1	4.97	8.16
2	5.32	8.21
3	4.09	6.11
4	4.02	5.78
5	3.95	4.44
6	5.08	7.69
7	5.10	7.41
8	4.38	5.29
9	4.31	5.36
10	5.09	6.22
Overall	4.64	6.65

```
. ttest dinside==0

One-sample t test

Variable |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
 dinside |     546    4.460551    .2701725    6.313025    3.929844    4.991258
---------+--------------------------------------------------------------------
    mean = mean(dinside)                                          t =  16.5100
Ho: mean = 0                                     degrees of freedom =      545

    Ha: mean < 0                 Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 1.0000         Pr(|T| > |t|) = 0.0000          Pr(T > t) = 0.0000
```

Panel B: Differences in Institutional Ownership

Year After Spinoffs	Mean	Stdev
1	-3.50	14.70
2	-6.35	15.28
3	-6.47	17.18
4	-5.39	20.45
5	-9.99	17.96
6	-10.13	19.78
7	-13.43	18.49
8	-8.43	19.94
9	-10.46	16.34
10	-6.95	17.09
Overall	-7.77	17.75

```
. ttest dinst==0

One-sample t test

Variable |     Obs        Mean    Std. Err.   Std. Dev.   [95% Conf. Interval]
---------+--------------------------------------------------------------------
   dinst |     513   -7.773273    .7835402    17.7468   -9.312622   -6.233923

    mean = mean(dinst)                                            t =  -9.9207
Ho: mean = 0                                     degrees of freedom =       512

    Ha: mean < 0                 Ha: mean != 0                 Ha: mean > 0
 Pr(T < t) = 0.0000         Pr(|T| > |t|) = 0.0000          Pr(T > t) = 1.0000
```

Table 4
Firm Statistics of Spunoff Firms and Parent Firms

This table provides firm characteristics of spunoff firms and parent firms (financial data collected from Compustat). All variables are defined in Appendix A. *Total Assets* are in millions, other variables are ratios.

	Variable	N	Mean	Median	Std Dev	t-test
Spunoff Firms	Total Assets	545	925.35	399.14	1,272.74	***
	Book Lev.	540	0.214	0.200	0.200	**
	Mkt. Lev.	538	0.223	0.161	0.222	
	Mkt-to-book	529	1.838	1.366	1.788	
	Tangibility	544	0.306	0.269	0.229	**
	Cash Ratio	544	0.119	0.058	0.160	***
	R&D	404	0.102	0.025	0.214	***
	Profitability	542	0.063	0.120	0.262	***
	FCF	491	0.027	0.076	0.250	***
Parent Firms	Total Assets	542	5,092.27	1,787.45	9,459.78	
	Book Lev.	542	0.262	0.241	0.232	
	Mkt. Lev.	542	0.229	0.147	0.240	
	Mkt-to-book	531	1.818	1.517	1.209	
	Cash Ratio	551	0.090	0.047	0.125	
	R&D	365	0.064	0.034	0.092	
	Profitability	452	0.119	0.153	0.149	
	FCF	419	0.059	0.091	0.118	
	Relatedness	545	0.286	0.000	0.453	

Table 5
Regression on Managerial Ownership

This table provides regression results on managerial ownership. The dependent variable is managerial ownership which is hand-collected for a sample of firms after spinoffs from proxy statements.

VARIABLES	(1)	(2)	(3)
Firm Size	-0.0475***	-0.0537***	-0.0474***
	(0.00343)	(0.00505)	(0.00343)
Free Cash Flow	0.104***		0.109***
	(0.0195)		(0.0202)
Tangibility	-0.0803**	-0.161***	-0.0820***
	(0.0311)	(0.0527)	(0.0312)
Leverage	-0.126***		-0.133***
	(0.0269)		(0.0278)
R&D		0.228***	
		(0.0389)	
Mkt-to-book		0.00395	0.00279
		(0.00326)	(0.00314)
Constant	0.333***	0.400***	0.325***
	(0.0216)	(0.0349)	(0.0230)
R-squared	0.264	0.232	0.266
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1			

Table 6
Regression on Institutional Ownership

This table provides regression results on institutional ownership. The dependent variable is institutional ownership which is collected for a sample of firms after spinoffs from proxy statements.

VARIABLES	(1)
Firm Size	0.0996***
	(0.00578)
Leverage	-0.356***
	(0.0443)
Free Cash Flow	0.0508
	(0.0463)
Volatility	0.000102
	(0.000253)
Constant	0.0864**
	(0.0347)
R-squared	0.442
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1	

Table 7
Regression on Institutional Ownership with Lagged Variables

This table provides regression results on spunoff firms' institutional ownership with lagged parent's institutional ownership as additional explanatory variables. Lag1-6 are parent's institutional ownership lagged 1-year to 6-year after spinoffs.

VARIABLES	(1) lag1	(2) lag2	(3) lag3	(4) lag4	(5) lag5	(6) lag6
Firm Size	0.0868***	0.0937***	0.0983***	0.100***	0.102***	0.103***
	(0.00590)	(0.00585)	(0.00566)	(0.00551)	(0.00531)	(0.00509)
Leverage	-0.279***	-0.310***	-0.318***	-0.328***	-0.329***	-0.298***
	(0.0453)	(0.0478)	(0.0485)	(0.0505)	(0.0498)	(0.0491)
Lag1	0.347***					
	(0.0444)					
Lag2		0.256***				
		(0.0425)				
Lag3			0.173***			
			(0.0412)			
Lag4				0.115***		
				(0.0406)		
Lag5					0.0889**	
					(0.0395)	
Lag6						0.0584
						(0.0386)
Constant	-0.0558*	-0.0407	-0.0192	0.00483	0.0120	0.0174
	(0.0306)	(0.0330)	(0.0346)	(0.0357)	(0.0363)	(0.0379)
R-squared	0.528	0.485	0.457	0.441	0.440	0.445

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix A: Variable Definition

All financial variables are collected from Compustat Database.

- Book leverage is measured as debt in current liabilities (*DLC*) plus total long-term debt (*DLTT*) divided by total assets (*AT*).
- Market Leverage $_{it} = \frac{DLTT+DLC}{DLTT+DLC+(PRCC*CSHO)}$

where *DLTT* is the amount of long-term debt, *DLC* is debt in current liabilities, including the portion of long-term debt due within one year, *PRCC* is the year-end common share price, and *CSHO* is the year-end number of common shares outstanding.

- Market-to-Book (M/B) is computed as:

$$M/B_{it} = \frac{AT_{it} - SEQ_{it} - TXDITC_{it} + (PRCC_{it} * CSHO_{it}) + PSTKL_{it}}{AT_{it}}$$

where *AT* is total assets, *SEQ* is book equity, *TXDITC* is deferred tax, *PRCC* is the year-end common share price, *CSHO* is the year-end number of common shares outstanding, and *PSTKL* is liquidation value of preferred stock.

- *Profit Volatility* is the standard deviation of Profitability.
- *Profitability* is operating income before depreciation (*OIBDP*) over total assets.
- *Tangibility* is fixed assets (*PPENT*) over total assets.
- *Firm size* is the natural log of total assets.
- *R&D* is Research and Development expense over total assets.
- *Free Cash Flow* (FCF) is free cash flow over total assets.
- *Relatedness* in an indicator, equal 1 if parent and spunoff firms are in the same industry (2-digit SIC code), 0 otherwise.

Appendix B: Correlation Table

This table provides correlation among explanatory variables. Variables are coded as followed:
umktlev: Market leverage; usize: Firm Size; utang: Tangibility; ufcf: Free Cash Flows; umb: Market-to-book; rd: R&D; uvola: Volatility.

	umktlev	usize	utang	ufcf	umb	urd	uvola
umktlev	1.0000						
usize	0.4301	1.0000					
utang	0.3664	0.2897	1.0000				
ufcf	0.1678	0.5301	0.2323	1.0000			
umb	-0.2799	-0.2368	-0.2006	-0.2328	1.0000		
urd	-0.2584	-0.5490	-0.2602	-0.8610	0.2325	1.0000	
uvola	-0.0406	-0.0628	-0.1320	-0.0244	0.0101	0.0392	1.0000

THE SEARCH FOR ALPHA AND THE PUBLIC FIRM RESPONSE

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ABSTRACT

Financial theory indicates that idiosyncratic risk may be important to investors that hold under-diversified portfolios. We investigate this issue by looking at hedge fund activism and target firm returns. We find that changes in idiosyncratic risk have an asymmetrical relation within positive and negative abnormal return samples. Changes in idiosyncratic risk have positive relation within target firms with positive abnormal returns and a negative relation within negative abnormal return target firms.

INTRODUCTION

Recently, new information has been learned about hedge fund activism and target firm returns. Hedge funds that acquire large equity stakes in target firms and intend to influence control of the firms must make a 13d filing. (Securities Exchange Act, 1934) Early empirical research by Brav et al. (2008) document positive target firm abnormal returns on the trading days surrounding the 13d filing event, and these firms do not experience return reversal afterwards. More recently, using a longer sample period and larger sample than Brav et al. (2008), von Lilienfeld-Toal and Schnitzler (2020) find hedge fund target firms earn positive abnormal returns and hedge funds help set payout policy of these firms. Consistent with these studies, Krishnan, Partnoy, and Thomas (2016) find that the abnormal returns to target firms during the 2008 to 2014 period were around seven percent.

In the capital asset pricing model of Sharpe (1964), Lintner (1965), and Mossin (1966), investors have homogeneous expectations and are able to diversify away firm-specific risk. As a result, only market risk is priced and investors are not compensated for bearing idiosyncratic risk. All investors hold the market portfolio since it earns the highest Sharpe (1966) ratio. However, recent empirical evidence indicates that hedge funds may not hold well-diversified portfolios. Griffin and Xu (2009) find that hedge funds hold on average 168 stocks. More recently, Agarwal et al. (2013) find that hedge funds hold an average of 138 and a median of 63 stocks. Since hedge funds hold portfolios that are concentrated in relatively few securities, they likely have not fully diversified away all idiosyncratic risk. This is supported by Ackermann, McEnally, and Ravenscraft's (2002) finding that hedge fund returns are more volatile than market indices. However, the higher volatility is likely not due to leveraged positions in the market portfolio since the existing literature finds hedge funds have relatively low exposure to market risk. (Asness, Krail & Liew, 2001; Bali, Brown & Caglayan, 2011) Therefore, idiosyncratic risk is likely to be important to hedge funds.

Hedge fund activists may tend to target companies that are small and undervalued (Brav et al., 2008). On the other hand, a company that sees itself as 'in trouble' or potentially in trouble may ask a hedge fund to make an investment to inject some capital. Building on the hedge fund activism and idiosyncratic risk literatures, we investigate the relation between abnormal target firm returns and firm specific risk, i.e., idiosyncratic risk. Merton's (1987) theoretical model predicts that firms with larger firm-specific variances have higher expected returns. However, Shleifer and Vishny (1997) present a model where idiosyncratic volatility cannot be diversified away, leading them to the conclusion that idiosyncratic volatility is important to specialized arbitrageurs. Based on their model, stocks with high idiosyncratic volatility may be overpriced and as a result earn a lower future return.

There is mixed empirical support for the Merton (1987) and Shleifer and Vishny (1997) models. Ang et al (2006, 2009) document a negative relation between idiosyncratic risk and returns while Fu (2009) finds a positive relation between expected idiosyncratic risk and returns. Kang, Kondor, and Sadka (2014) document the relation between hedge fund ownership and idiosyncratic risk. Extreme idiosyncratic risk stocks with high hedge fund ownership experience the largest quarterly changes in idiosyncratic volatility. We contribute to this literature by providing evidence that target firm abnormal returns are related to changes in idiosyncratic risk.

Recent research on hedge fund activism investigates a variety of topics, but to the authors knowledge current research has not investigated the relation between target firm returns and idiosyncratic risk. There is evidence hedge funds help facilitate bankruptcy restructurings, improve innovation and operating performance, and assist target firms in their

acquisition and divestiture strategy. (See respectively Lim, 2015; Brav et al., 2018; Brav, Jiang & Kim, 2015b; Tang, 2020; Gantchev, Sevilir & Shivdasani, 2020; Danis, 2020) develops a theoretical model of shareholder activism in which the activist holds a large position and monitors the target firm. Boyson, Gantchev, and Shivdasani (2017) provide evidence activist help facilitate mergers and acquisitions of the target firm and this helps increase target firm shareholder value. Aslan and Kumar (2020) investigate spillover effects of hedge fund activists on target firm rivals. Reviews of the hedge fund activism literature are available in Brav, Jiang, and Kim (2015a) and Denes, Karpoff, and McWilliams (2017).

DATA AND METHODOLOGY

Accounting and stock market return data are obtained from Compustat and CRSP, respectively. Carhart (1997) four factor data are collected from Kenneth French's personal website.[1]

We identify a sample of hedge fund activism using Schedule 13d filings, or "beneficial ownership reports", submitted to the SEC.[2] We use 13d filings to determine instances where hedge funds acquire more than five percent of a company's shares outstanding. The Securities Exchange Act of 1934 section 13(d) requires that any natural person, company, government, or political subdivision, agency, or instrumentality of a government that directly or indirectly becomes the beneficial owner of more than five percent of any equity security must file within ten days a statement with the Securities and Exchange Commission. This financial statement, commonly referred to as a 13d filing, must contain, among other things:

Background, and identity, residence, and citizenship of, and the nature of such beneficial ownership
Source and amount of the funds or other consideration used or to be used in making the purchases
If the purpose of the purchases or prospective purchases is to acquire control of the business of the issuer of the securities

The number of shares of such security which are beneficially owned, and the number of shares concerning which there is a right to acquire. (Securities Exchange Act, 1934)

Beneficial owner is defined in the Code of Financial Regulations section 240.13d-3 as any person who directly or indirectly has voting or investment power over a security (e.g., ability to sell the security).

As part of our analysis, we utilize the Baron and Kenny (1986) econometric methodology to assess whether changes in idiosyncratic risk act as moderating and mediating variables. They define a moderating variable as a variable that changes the direction or magnifies the relation between dependent and independent variables. Moderation can be assessed by estimating regression models containing interaction terms between moderating and explanatory variables. If a variable act as a moderator, the interaction term regression coefficient should be statistically significant. Based on Baron and Kenny (1986), a mediating variable is an intermediary variable that is influenced by other independent variables and directly impacts the dependent variable. Baron and Kenny (1986) provide a three-step econometric approach to assess whether a variable is a mediating variable (for details see Appendix A). The three steps are:

Regress the dependent variable on the independent variables.
Regress the mediating variable on the independent variables.
Regress the dependent variable on the independent variables and mediating variable.

In step three, we use a stepwise forward regression approach to determine the variables included in the final model.[3] We start by regressing the dependent variable on a single independent variable. If the independent variable is statistically significant, we keep that variable in successive models, otherwise the variable is discarded and we move on to the next independent variable. To be included in subsequent models, an explanatory variable must be statistically significant at the ten percent level when first introduced and be statistically significant at the five percent level in any successive models. This process continues through all variables. Equation (1) provides the model.

[1] Kenneth French's website is http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html .
[2] We would like to thank Alon Brav and his coauthors for providing data on Schedule 13d filings.
[3] We obtain similar results by using Ordinary Least Squares (OLS) regressions with standard errors clustered by target firms in step three.

$$CAR_{it} = \alpha_i + \sum_{j=1}^{n} \beta_i X_{jit} + \varepsilon_{it} \quad (1)$$

Our dependent variable is cumulative abnormal returns (CARs) calculated by regressing daily stock returns in excess of the Treasury bill rate on the Carhart (1997) book-to-market, market, momentum, and size factors. The independent variables X_j $(j = 1 \ldots n)$ include amount of cash held by the target firm, change in idiosyncratic risk, quarterly changes in shares held by financial institutions, stock volatility, trading volume, indicator variables for the Technology bubble, subprime loan crisis, and white-collar outsourcing periods, as well as indicator variables for high, moderate, or low values of Altman's Z score and an indicator variable if the target firm delists after the 13d filing date. Variable definitions for all variables can be found in the Appendix B. The hypothesized relation between cumulative abnormal returns surrounding hedge fund acquisition events is shown in Figure 1.

RESULTS

We calculate the average and ratio of positive to negative cumulative abnormal returns for target stocks on trading days surrounding hedge fund 13d filing events and report these statistics in Table 1. The evidence presented in Table 1 indicates that there are positive abnormal returns earned during the ten days surrounding the announcement of a hedge fund acquisition. However, in the roughly six months following the announcement, target stocks earn negative abnormal returns.

Using univariate regressions, we regress cumulative abnormal returns on each independent variable and report the coefficients and corresponding *t*-statistics in Table 2. We estimate regressions for the positive, negative, and pooled cumulative abnormal return samples. Cumulative abnormal returns are calculated for the ten trading days surrounding the hedge fund 13d event. Stocks that are fully acquired by hedge funds earn lower cumulative abnormal returns during the trading days surrounding the 13d filing event. Changes in idiosyncratic risk are negatively related with cumulative abnormal returns. This result holds for the full sample as well as for the positive and negative cumulative abnormal return subsamples.

Regression estimates for the positive and negative cumulative abnormal return samples are reported in the third and fourth columns of Table 2, respectively. For the positive cumulative abnormal return sample, consistent with investors being compensated for bearing distress risk, low distress risk stocks i.e., high Altman *Z*-score stocks, earn lower abnormal returns while stocks with high distress risk earn higher abnormal returns. Additionally, stocks with high return volatility in the period preceding the 13d event earn higher abnormal returns in the days surrounding the event.

Within the negative cumulative abnormal return sample, amount of cash a target firm has on hand, changes in idiosyncratic risk, stock return volatility, and target stock delistings have a negative relation with cumulative abnormal returns. Cumulative abnormal returns are also lower during the white-collar outsourcing period than other periods. These results indicate that risk is particularly important within stocks with negative cumulative abnormal return stocks.

We regress changes in idiosyncratic risk on the explanatory variables and report the regression coefficients and *t*-statistics in Table 3. We find that low distress risk stocks have lower changes in idiosyncratic risk. Changes in idiosyncratic risk for target firms were higher on average during the subprime loan crisis than during other periods. Additionally, changes in idiosyncratic risk are positively related with the amount of cash held by target firms.

For positive and negative cumulative abnormal return samples, we repeat the changes in idiosyncratic risk on other explanatory variable regressions and report the results in table 3, columns 3 and 4. For the positive cumulative abnormal return sample, we find a negative relation between changes in idiosyncratic risk and volatility and distress risk. Consistent with the pooled results, changes in idiosyncratic risk are on average higher during the subprime loan crisis. Changes in idiosyncratic risk are again negatively related with distress risk within the negative cumulative abnormal return sample.

We further investigate the relation between cumulative abnormal returns and explanatory variables using regression models that include interactions between changes in idiosyncratic risk and other independent variables. The explanatory variables appearing in the final regression model are determined using the stepwise approach discussed earlier. Table 4 reports coefficients and *t*-statistics from these regressions. We report results for the pooled sample as well as for the positive and negative cumulative abnormal return samples. Explanatory variables for the positive and

negative cumulative abnormal return subsamples are determined using the stepwise approach, independently of each other and independent from the variables used in the full sample.

During the ten days surrounding 13d filing events, cumulative abnormal returns are negatively related to changes in idiosyncratic risk. The relation between cumulative abnormal returns and the interaction between changes in idiosyncratic risk and volatility is positive within positive cumulative abnormal return stocks but negative within negative cumulative abnormal return stocks. In net, cumulative abnormal returns are negatively related with the interaction between changes in idiosyncratic risk and volatility. Volatility magnifies cumulative abnormal returns, having a positive relation within positive cumulative abnormal return stocks and a negative relation within negative cumulative abnormal return stocks.

Positive cumulative abnormal returns are lower within firms with low distress risk. Negative cumulative abnormal returns are lower during the white-collar outsourcing period and within distressed firms. Trading volume and the interaction between trading volume and changes in idiosyncratic risk are statistically related to negative cumulative abnormal returns.

DISCUSSION

The evidence presented in this paper indicates that changes in idiosyncratic risk act as a moderating variable between cumulative abnormal returns and distress risk, volatility, and trading volume. Based on Baron and Kenny (1986), to determine whether or not a variable is a mediating variable, an independent variable must have a relation with the dependent variable and mediating variable and the mediating variable must have a relation with the dependent variable. We provide evidence that there are relations between cumulative abnormal returns and risk, i.e., changes in idiosyncratic risk and volatility. Thus, there is some evidence that changes in idiosyncratic volatility act as a mediating variable. We find that volatility is positively related to cumulative abnormal returns in the positive cumulative abnormal return sample, but negatively related within the negative sample.

CONCLUSION

The existing literature shows a relation between hedge fund activism and target firm performance. Our results add to this by documenting the relation between target firm returns and changes in idiosyncratic risk. However, we find that this relation is asymmetric, changes in idiosyncratic risk and returns are positively related within positive cumulative abnormal returns target firms but negatively related within negative cumulative abnormal return firms. These results contribute to the hedge fund activism literature by showing that some results may change within different samples of target firms. Future research can investigate whether some common findings in the literature are robust across positive and negative cumulative abnormal return samples.

APPENDIX

A. Mediator and Moderator Models

Baron and Kenny (1986) provide a three-step econometric approach to understand the relationship between independent variables and a dependent variable in a time series or cross-sectional regression. Our dependent variable is the cumulative abnormal returns (CARs). Our independent variables include amount of cash held by the target firm, quarterly changes in shares held by financial institutions, stock volatility, trading volume, indicator variables for the Technology bubble, subprime loan crisis, and white-collar outsourcing periods, as well as indicator variables for high, moderate, or low values of Altman's Z score and an indicator variable if the target firm delists after the 13d filing date. We select the change in idiosyncratic risk around an event date as our mediator or moderator variable. Figure 1 depicts an illustrative relationship among three variables: cumulative abnormal returns, expected firm volatility and the change in idiosyncratic risk.

For example, the moderator variable, change in idiosyncratic risk, influences the independent variable, expected firm volatility, to transform how the independent variable (expected firm volatility) explains the dependent variable, CARs. Just as the Carhart (1997) four-factor model explains a return, we modify the residuals by extracting the change in idiosyncratic risk from them. If the change in idiosyncratic risk is statistically significant when we regress it against CARs, i.e., if it stands alone and acts directly on the dependent variable, then we use it as a mediator variable. As a moderator variable, the change in idiosyncratic risk works in conjunction with other independent variables on the dependent variable, i.e., the Carhart four-factor residuals.

We modify Baron and Kenny's (1986) three-step approach for use in our stepwise regression process. In step one, we regress CARs using ordinary least squares against each independent variable X_j to determine that the relationship is statistically significant.

$$CAR_{it} = \alpha_i + \beta_i X_{jit} + \varepsilon_{it} \quad (2)$$

In step two, we develop the mediator/moderator variable. We partition the variance of returns ($Var(R_i)$) on each firm i's stock into systematic risk (SYS_i) and idiosyncratic risk (Var(ε_i)) and use the four-factor event study methodology to develop the slopes and residuals. We compute the pre- and post-variances for each event using the residuals and calculate the change in idiosyncratic risk for each event on a pre-announcement, t = (-137 to - 11), to post-announcement, t = (+11 to +137) basis. We measure changes in the variance as

$$\Delta Var(R_i) = \frac{Var(R_{i,post}) - Var(R_{i,pre})}{Var(R_{i,pre})} \quad (3)$$

We calculate systematic risk based on the four-factor model of Carhart (1997), using Bali, Brown and Caglayan (2012) methodology.

$$R_{it} = \alpha_i + \beta_{i,MKT} MKT_{it} + \beta_{i,SMB} SMB_{it} + \beta_{i,HML} HML_{it} + \beta_{i,MOM} MOM_{it} + \varepsilon_{it} \quad (4)$$

where R_{it} is the excess return on stock i, MKT_{it} is the excess market return, and SMB_{it}, HML_{it}, $and\ MOM_{it}$ are the size, book-to-market, momentum factors, respectively. The total risk is the variance of R_{it}: $\sigma_i^2 = Var(R_i)$. The idiosyncratic risk is the variance of ε_{it}: $\sigma_{\varepsilon i}^2 = Var(\varepsilon_i)$. The systematic risk of stock i is defined as the difference between total and unsystematic variance: $SYS_{it} = Var(R_i) - Var(\varepsilon_i)$. We measure changes in idiosyncratic risk as

$$\Delta idiosyncratic\ risk = \Delta Var(\varepsilon_i) = \frac{Var(\varepsilon_{i,post}) - Var(\varepsilon_{i,pre})}{Var(\varepsilon_{i,pre})} \quad (5)$$

We then regress the mediator/moderator variable against the independent variables using ordinary least squares regression to determine whether it is statistically significant. The mediator/moderator variable must be statistically significant for it to me used in the stepwise regression.

$$ME_{it} = \gamma_i + \sum_{j=1}^{n} \beta_i X_{jit} + \varepsilon_{it} \quad (6)$$

where

$$ME_i = \Delta idiosyncratic\ risk = \frac{Var(\varepsilon_{i,+11,+137}) - Var(\varepsilon_{i,-137,-11})}{Var(\varepsilon_{i,-137,-11})} \quad (7)$$

In the final step, we include the mediator/moderator variable in the stepwise regression. The moderator model is the more general model with both the standalone moderator variable and the interaction terms between the moderator variable and the independent variables.

B. Variable Definitions

Abnormal return (*AR*): Daily abnormal returns are calculated as the difference between a stock's return in excess of the daily Treasury bill rate and the stock's expected return based on the Carhart (1997) four factor model. Four factor model parameters are estimated for each stock event using 126 days of daily data occurring from 137 to 11 days before the event.

Altman Z Score: Calculated using the definition given in Altman (1968): 1.2 times net working capital to assets plus 1.4 times retained earnings to assets plus 3.3 times EBIT to assets plus 0.4 times market value of equity to book value of liabilities plus sales to assets.

Altman Z Score (*high*): Indicator variable that takes a value of 1 if a firm's Altman Z score is greater than or equal to 2.97 and is zero otherwise.

Altman Z Score (*low*): Indicator variable that takes a value of 1 if a firm's Altman Z score is less than 1.81 and is zero otherwise.

Altman Z Score (*moderate*): Indicator variable that takes a value of 1 if a firm's Altman Z score is greater than or equal to 1.81 and less than 2.97 and is zero otherwise.

Cumulative abnormal return (*CAR*): Cumulative abnormal returns are estimated by compounding daily abnormal returns occurring during the ten trading days surrounding the hedge fund 13d acquisition event, inclusive of the event date.

Cash: Cash & marketable securities scaled by total assets from the target's balance sheet for the quarter preceding the 13D filing event window.

Change in idiosyncratic risk (*ΔIdiosyncratic risk*): Defined as the change in idiosyncratic risk scaled by idiosyncratic risk prior to the 13D event date. Idiosyncratic risk is defined as the variance of residuals estimated by regressing daily excess returns on the Carhart (1997) four factors. Change in idiosyncratic risk is calculated as the difference between the variance of the residuals from days -137 to -11 and days +11 to +137.

Change in institutional shares held (*Change in shares held*): Quarterly change in the number of shares held by institutional investors scaled by the number of shares held by institutional investors at the start of the period multiplied by 100, calculated using the most recent holdings data available prior to the 13D event date.

Leader – Follower: Indicator variable that takes a value of one if a different hedge fund filed form 13D within 180 calendar days of the original 13D filing event.

Delisting: Indicator variable that takes a value of one if the firm delists at any point between 11 and 262 days after the event and is zero otherwise.

Subprime loan crisis: Indicator variable that is one if event window is between the years 2003 and 2009 and is zero otherwise.

Technology bubble: Indicator variable that is one if event window is between the years 1996 and 2001 and is zero otherwise.

Volatility: Expected stock return volatility estimated using a GARCH model over days -137 to -11, where day 0 is the 13d filing date.

Volume: Total trading volume during the 21 trading days surrounding the event window, inclusive of the event date, scaled by the firm's total assets at the end of the fiscal quarter immediately before the start of the event window.
White – collar outsourcing: Indicator variable that is one if event window is between the years 1996 and 2010 and is zero otherwise.

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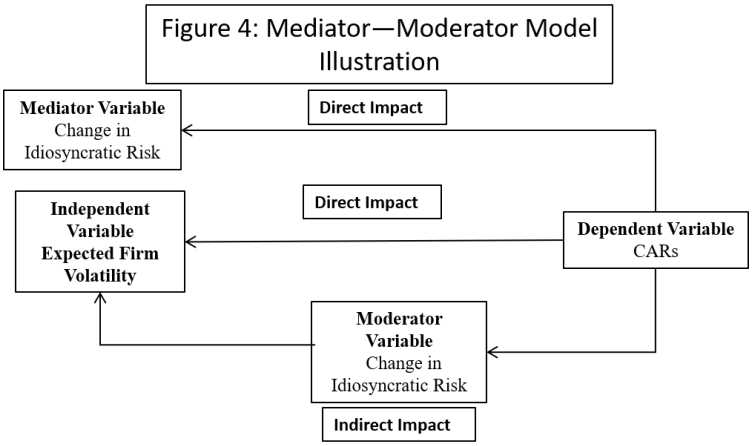
Figure 1 Mediator – Moderator Flow Chart



Notes: This figure provides a visual representation of the hypothesized relation between cumulative abnormal returns, expected firm volatility, and changes in idiosyncratic risk.

Table 1

Cumulative abnormal return statistics for 13d filing events

Event Window	Average CAR	Positive/Negative
(-137, -11)	0.74%	1317: 1569***
	(0.74)	(-4.69)
(-10, +10)	4.54%***	1822:1170***
	(12.44)	(11.92)
(+11, +137)	-5.21%***	1106:1890***
	(-6.61)	(-14.32)

Notes: This table shows the average (Average CAR) and ratio of positive to negative (Positive/Negative) cumulative abnormal returns for target stocks on the trading days surrounding 13d filing dates. *z*-statistics are presented in parentheses. Statistical significance at the ten, five, and one percent levels are denoted with *, **, and ***, respectively.

Table 2

Cumulative abnormal return regression coefficients

	Cumulative Abnormal Return Sample		
Independent Variable:	All	Positive	Negative
Altman Z (high)	0.0074	-0.0316***	0.0321***
	(0.84)	(-3.27)	(3.82)
Altman Z (low)	-0.0092	0.0442***	-0.0412***
	(-1.06)	(4.53)	(-5.15)
Altman Z (middle)	0.0028	-0.0164	0.0181*
	(0.27)	(-1.41)	(1.79)
Cash	-0.0274	0.0211	-0.0740***
	(-1.56)	(1.11)	(-4.50)
Change in idiosyncratic risk	-0.0061***	-0.0031**	-0.0044***
	(-5.56)	(-1.97)	(-5.35)
Delisted	-0.3217***	-0.1076	-0.2105***
	(-6.47)	(-0.88)	(-6.48)
Subprime loan crisis	-0.0081	-0.0025	-0.0152**
	(-1.11)	(-0.30)	(-2.12)
Technology bubble	0.0036	0.0216**	-0.0003
	(0.39)	(2.10)	(-0.03)
Volatility	-0.0523	7.4224***	-6.1169***
	(-0.06)	(8.09)	(-8.27)
White-collar outsourcing	-0.0062	0.0169*	-0.0245***
	(-0.72)	(1.80)	(-2.86)

Notes: This table shows coefficient estimates and *t*-statistics (in parentheses) from univariate ordinary least squares regressions of cumulative abnormal returns on financial variables for target stocks. Cumulative abnormal returns are calculated during the ten trading days surrounding the acquisition event. Descriptions of these variables are given in the Appendix. Statistical significance at the ten, five, and one percent levels are denoted with *, **, and ***, respectively.

Table 3

Changes in idiosyncratic risk regression coefficients

	Cumulative Abnormal Return Sample		
Independent Variable:	All	Positive	Negative
Intercept	0.5026**	0.4318***	0.3599
	(2.23)	(3.09)	(0.65)
Altman Z(high)	-0.6255***	-0.2772**	-0.9052*
	(-3.18)	(-2.20)	(-1.96)
Altman Z(middle)	-0.3256	-0.2735*	-0.1669
	(-1.34)	(-1.83)	(-0.30)
Cash	0.7879**	0.3838	0.4852
	(2.13)	(1.61)	(0.54)
Subprime loan crisis	0.7579**	0.4648**	1.0266
	(2.51)	(2.33)	(1.54)
Technology bubble	0.2480	0.1738	0.1187
	(0.69)	(0.74)	(0.14)
Volatility	-19.3120	-21.3780**	-28.7767
	(-1.37)	(-2.44)	(-0.84)
Volume	-0.0000	-0.0000	0.0000***
	(-0.24)	(-0.55)	(2.78)
White-collar outsourcing	-0.2896	-0.3499	0.0435
	(-0.87)	(-1.63)	(0.06)
Number of Observations	1144	698	446
F-statistic	2.72	2.12	2.16
Probability > F	0.0026	0.0210	0.0190
Adjusted R2	0.0148	0.0158	0.0255

Notes: This table shows statistically significant regression coefficient estimates and *t*-statistics (in parentheses) from ordinary least squares regressions of changes in idiosyncratic risk on financial variables. Statistical significance at the ten, five, and one percent levels are denoted with *, **, and ***, respectively.

Table 4

Cumulative abnormal return interaction model regression coefficients

	Cumulative Abnormal Return Sample		
Independent Variable:	All	Positive	Negative
Intercept	0.0461***	0.1303***	-0.0374***
	(74.83)	(232.07)	(9.09)
Altman Z (high)	.	-0.0271**	.
	.	(5.75)	.
Altman Z (low)	.	.	-0.0380***
	.	.	(11.33)
Altman Z (low)*Volatility	.	.	9.8665**
	.	.	(5.26)
Change in idiosyncratic risk	-0.0051**	-0.0134***	.
	(4.86)	(7.26)	.
Volatility	.	12.7936***	-13.8249***
	.	(27.66)	(10.58)
Volatility*ΔIdiosyncratic risk	-1.2041***	9.9523***	-4.8989***
	(10.08)	(15.39)	(41.45)
Volume	.	.	-0.0000***
	.	.	(36.54)
Volume*ΔIdiosyncratic risk	.	.	0.0000****
	.	.	(27.44)
White-collar outsourcing	.	.	-0.0245**
	.	.	(4.12)
Number of Observations	1144	698	446
F-statistic	18.90	10.91	23.36
Probability > F	<0.0001	<0.0001	<0.0001
Adjusted R2	0.0321	0.0592	0.2719

Notes: This table shows regression coefficient estimates and *t*-statistics (in parentheses) from ordinary least squares regressions of cumulative abnormal returns on financial variables. Regression variables are determined using a stepwise regression approach. Statistical significance at the ten, five, and one percent levels are denoted with *, **, and ***, respectively.

GOVERNMENTAL RESPONSE TO VACCINATION PASSPORTS

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ABSTRACT

The vaccine passport approach affords the individual the ability to demonstrate proof of vaccination. If a person chooses to be vaccinated and is inoculated against the Covid-19 virus, the vaccine passport is a tool that enables the inoculated individual to maintain their own health information for verification purposes. The vaccine passport may include a document, digital record, software application or QR code indicating that a person has been vaccinated. State intervention will need to be considered in light of existing police power that is reserved to the states. In response, states have begun to introduce legislation or executive actions to address the issue of vaccine passports. The vaccine passport approach raises social concerns, public health and safety protections, discretionary requirements, prohibitions, and compliance enforcement. Governmental authority and responsibility in matters of public health emergencies is paramount in order to coordinate and direct appropriate and effective responses. Public health decisions are made in conjunction with health care providers, the private sector, and the general public. Prior research to examine the variances in the policy making associated with health passport legislation or executive action within the United States has been limited. To address this gap in the literature, this paper will examine vaccine passport legislative trends including personal health choice, informed decisions, scope and limits of responsibility, standardized documentation, healthcare right of privacy, right of access and storage and retrieval of patient information.

GOVERNMENTAL RESPONSE TO VACCINATION PASSPORTS

This paper presents a literature review and critique of applicable state laws and specific aspects of the governmental response to vaccination status to understand the emerging public health and safety trends. Virtually everyone is contending with personal and public health issues related to the COVID-19 pandemic. States in particular are either enacting mandates or banning mandates with regard to vaccinations, masks, testing and proof of COVID vaccinations. Employers have also issued employment policies requiring employees to be vaccinated against COVID-19 and to provide proof of their vaccination status. The response to these approaches varies greatly. Lawsuits for or against mandates have been filed among other forms of challenge. The primary reason for mandates or mitigation measures is safety. The principal counterpoint to mandates is individual liberties.

State laws have been enacted that address state interests, the rights of individuals and have promulgated policies and regulations that address vaccine passports. However, the applicable state laws lack uniformity.

This study evaluates the various state statutes and summarizes the similarities and differences of the proof of vaccination laws that have been adopted by the states. This paper attempts to examine important aspects of current state legislation that enables the individual to make health care decisions. In addition, the paper investigates further provisions to expand public health safeguards for the community.

NATIONAL RESPONSE

In order to review the state governmental response to vaccination status, this paper highlights the overarching response to vaccination status at the national level.

Equal Employment Opportunity Commission

On May 28, 2021, the U.S. Equal Employment Opportunity Commission expanded its technical assistance regarding the COVID-19 pandemic (E.E.O.C. Press Release). The EEOC advised that employers may require employees to be vaccinated against COVID-19 consistent with reasonable accommodations for disabilities and religious beliefs that preclude vaccination (K1). In addition, employers may also offer incentives to employees to voluntarily provide documentation or other confirmation of vaccination status (K16).

Health and Human Services/ U.S. Department of Justice Opinion

Since December 2020, the Food and Drug Administration granted emergency use authorizations for three vaccines to prevent coronavirus disease, COVID-19. On July 6, 2021, the Office of Legal Counsel of the U.S. Department of Justice issued a Memorandum Opinion for the Deputy Counsel to the President concerning an interpretation of Section 564 of the Food, Drug, and Cosmetic Act. The federal statute authorizes the Food and Drug Administration to issue an emergency use authorization for a vaccine under certain emergency circumstances (21 U.S.C. 360bbb-3). According to the Opinion, the federal statute does not prohibit or limit the ability of public or private entities from imposing vaccination requirements for vaccines that are subject to emergency use authorizations.

On August 23, 2021 the U.S. Food and Drug Administration (F.D.A. News Release) announced the approval of the Pfizer-BioNTeh COVID-19 Vaccine on the basis of safety and effectiveness data that the vaccine is found to be effective in preventing COVID-19 and potentially serious outcomes including hospitalization and death.

Presidential Executive Order

On January 21, 2021, President Biden announced the National Strategy for the COVID-19 Response and Pandemic Preparedness. Goal One of the action plan is to restore trust with the American people. To continue to restore trust, the plan calls upon the federal government to build clear channels of communication with state and local leaders.

On September 9, 2021, President Biden signed an Executive Order mandating each federal agency to require COVID-19 vaccination for all federal employees (Exec. Order No. 14043). The purpose of the directive, known as the COVID-19 Action Plan, is to promote the health and safety of the Federal workforce and ensure the efficiency of the civil service.

American Medical Association Guidance

At the AMA House of Delegates meeting, the American Medical Association adopted a policy entitled, Digital Vaccine Credential Systems and Vaccine Mandates in COVID-19 (H-440.808). The strategy proposes the development of federal guidelines for the use of digital COVID-19 vaccine credentials.

To protect public health and public trust, the AMA policy proposes appropriate measures including the accessibility of the vaccine and equity-centered privacy protections to safeguard data. In addition, the AMA advocates that digital vaccine credential efforts ensure inequities are not exacerbated and address concerns for individuals for whom the COVID-19 vaccine is medically contraindicated.

The AMA policy suggests that the vaccination credentials not be provided on the basis of natural immunity or prior SARS-CoV-2 infection.

JUDICIAL INTERPRETATIONS

In order to review the state governmental response to vaccination status, this paper reviews the relevant challenges to employer vaccination policies and proof of vaccination requirements. Prior to the COVID-19 pandemic, society faced other widespread epidemic dangers including cholera, yellow fever, and smallpox. State legislatures and courts enforced measures to prevent the transmission and the spread of these contagious diseases and protect the community including compulsory vaccination, quarantine, isolation, and limitations.

In an early decision of the Supreme Court of the United States, the Court reviewed a challenge to a state compulsory smallpox vaccination statute in which an individual refused to undergo a vaccination. *Jacobson v. Massachusetts*, 197 U.S. 11 (1905). The Court rejected the challenge. Justice Harlan reasoned "that a community had a right to protect itself against an epidemic which threatened the safety of its members." The Court determined that the liberty of an individual is not absolute being subject to restraint for the common good of society. In upholding the constitutionality of the statute, the Court acknowledged the authority of the state to protect the health and safety of the public.

Recently, a significant challenge was made to an employer policy at a Texas hospital. In the case of *Bridges v Houston Methodist Hospital*, 2021 U.S. Dist. LEXIS 110382 (S.D. Tex., June 12, 2021), the employer required employees to be vaccinated against COVID-19. Certain employees sued the employer to block the injection requirement alleging that the employer policy forced employees to be vaccinated or be fired. The Court determined that the injection requirement did not violate public policy and found that the employees were not coerced to comply. The Court noted that the employee could freely choose to accept or refuse a COVID-19 vaccine but could be terminated for refusal.

In July 2021, employees at a California university sought injunctive relief to challenge a COVID-19 vaccination program requiring personnel, students and trainees to provide proof of full vaccination or to submit a request for exception as a condition for physical presence at the school. The stated purpose of the policy was to protect the health and safety of the University community. The Court found a rational basis for the University instituting the mandatory vaccination measures and determined that the University policy requiring proof of vaccination served the interests of the public. The United States District Court for the Central District of California denied the request for a temporary restraining order and declined to intervene in the matter of *America's Frontline Doctors v Wilcox*, 2021 U.S. Dist. LEXIS 144477 (C.D. Calif., July 30, 2021). On appeal, the Court of Appeals for the Ninth Circuit denied the petition. *America's Frontline Doctors v Wilcox*, 2021 U.S. App. LEXIS 23885 (9th Cir. Cal. August 11, 2021).

In the case *Klaassen v Trs. of Ind. Univ.*, 2021 U.S. Dist. LEXIS 133300, 2021 WL 3073926 (N.D. Ind., July 18, 2021), students contested an Indiana University announcement that all students must be vaccinated by a medical provider against COVID-19 and report their vaccination status unless they are exempt for religious or medical reasons. In addition, those exempt students are required to wear masks and be tested for the disease twice a week. In denying a request for a preliminary injunction, the United States District Court for the Northern District of Indiana recognized the university had a legitimate interest in promoting the public health of its campus communities. Judge Leichty ruled that the policies of the university were rationally related to pursuing the public health and safety of its campus communities. In reaching the decision, the Court balanced the harms and the relevant public interest in favor of the university and determined that the school had reasonably chosen the best course of action for the health of its academic community.

On appeal of the decision, the United States Court of Appeals for the Seventh Circuit determined that the condition of higher education may include a requirement to be vaccinated against COVID-19 or wear masks and be tested. *Klaassen v Trustees of Indiana University*, 2021 U.S. App. LEXIS 22785 (7th Cir., August 2, 2021).

In compliance with the Virginia Executive Order (Va. Exec. Order No. 18-2021), Chief District Judge Davis ordered employees and contractors of the District Court to be vaccinated against COVID-19 virus or alternatively to be tested twice a week and wear a mask while indoors in the Courthouses and Court facilities (*In re Court Operations Under the Exigent Circumstances Created by the Outbreak of Coronavirus Disease COVID-19*).

Employers have implemented vaccine mandates for their employees. In the case *Hencey v United Airlines, Inc.*, 2021 U.S. distr. LEXIS 154513 (August 17, 2021), the employees opposed a vaccine mandate by their company seeking a Temporary Restraining Order. The petition was denied for lack of explanation for their claims. In the case *Wade v Univ. of Conn. Bd. of Trs.*, 2021 U.S. Dist. LEXIS 153565 (August 28, 2021), the University formulated a mandatory vaccination policy for students against COVID-19 virus to promote health and safety. Students objected to the mandate and the requirement to show proof of vaccination and sought a preliminary injunction. The Court dismissed the claim for a lack of federal jurisdiction to adjudicate the claim.

FEATURES OF STATE VACCINATION STATUS REGULATIONS

The governmental response to vaccination status differs among the jurisdictions, however for purposes of this investigation the paper will specifically address the function and scope of the governmental response to vaccination status. Numerous vaccination or immunization status laws have been enacted by states to provide statutory standards to regulate the disclosure or non-disclosure of vaccination status. Many of the statutory provisions either proscribe or address the use of vaccine passports. Therefore, several states have intervened to regulate the implementation of these practices. The vaccination status laws have many similarities and unique specific provisions. In this paper, the regulatory or legislative differences of a random sample of vaccination status laws are documented for comparative analysis.

Regulatory Intent

State laws identify certain purposes for enacting vaccination passport related legislation. According to the Georgia Executive Order (Ga. Exec. Order 05.25.21.01), the purpose of the prohibition order against COVID-19 vaccine passports is to protect the individual liberty of its citizens. The stated intent of the proposed Delaware House Bill (Del. H.B. 209) is to protect the freedom of religion and healthcare privacy and avoid coercion. The draft legislation was introduced on June 3, 2021 and assigned to the Administration Committee for review.

The New Hampshire Statute (N.H. Rev. Stat. Ann 141-C) declares that every person has the inherent right to bodily integrity and medical freedom in immunizations. The basis for the South Dakota Executive Order (S.D. Exec. Order 2021-08) proposes that a vaccine passport program would restrict speech, travel, association, and other civil rights. In addition, a vaccine passport program would confer social privilege on the basis of fitness that is immoral discrimination.

New Jersey Governor Murphy signed an Executive Order (N.J. Exec. Order No. 253) which declared a vaccine mandate. The purpose of the directive is to protect the public health, safety, and welfare against the emergency created by COVID-19.

Principle of Health Autonomy

The Georgia Executive Order upholds the principle that individuals have autonomy over their health and their decision to receive the COVID-19 vaccine (Ga. Exec. Order 05.25.21.01).

Definition of Vaccination Passport

Under the provisions of the Executive Order of the State of South Carolina (S.C. Exec. Order No. 2021-23), a vaccine passport is defined as any uniform or standardized documentation developed for the purpose of verifying, confirming, or certifying an individual's vaccination status solely with respect to the administration of any COVID-19 vaccine or publishing or sharing an individual's COVID-19 vaccination record or status or corresponding personal health information to a third party. According to the Georgia Executive Order (Ga. Exec. Order 05.25.21.01), the vaccine passport program means any program that would determine the COVID-19 vaccination status of an individual.

The Indiana House Enrolled Act No. 1405 (2021 Ind. Acts 1405) defines an immunization passport as a written, electronic, or printed information regarding the immunization status of an individual. According to pending legislation Michigan House Bill 4667 (Mich. H.B. No. 4667), a COVID-19 vaccination passport is a written or electronic documentation for the purpose of certifying that an individual has received a vaccination or immunized against COVID-19. The Tennessee Senate Bill (Tenn. S.B. 858) describes proof of vaccination to mean the physical documentation or digital storage of protected health information related to the immunization or vaccination of an individual against COVID-19.

According to the New York City Emergency Executive Order (New York City Emer. Exec. Order No. 225, proof of vaccination may be established by a CDC COVID-19 Vaccination Record Card, a New York City COVID Safe Pass or a New York State Excelsior Pass.

Development/Establishment Restrictions

The South Carolina Executive Order (S.C. Exec. Order 2021-23) prohibits any state agency, department, official or employee from developing a vaccine passport. The Arizona Statute (Ariz. S.B. 1824) prohibits the state from establishing a COVID-19 vaccine passport.

Certification Issuance Restrictions

According to the Alabama law (Ala. S.B. 267) and Idaho Executive Order (Idaho Exec. Order No. 2021-04), no state government entities are permitted to issue vaccine or immunization passports, vaccine or immunization passes, or any other standardized documentation for the purpose of certifying the immunization status of an individual. The Florida Executive Order (Fla. Exec. Order No. 21-18) is quite broad and stipulates that no governmental agency is permitted to issue vaccine passports, vaccine passes, or other standardized documentation to certify a COVID-19 vaccination status to a third party.

Identification Card Restriction

States have introduced legislation that restricts state agencies from issuing vaccination passports. According to the Iowa Statute (Iowa H.F. 889), any identification card issued by a state agency cannot indicate whether the holder of the card has received a vaccination for COVID-19. The Indiana House Enrolled Act No. 1405 (2021 Ind. Acts 1405) and the South Carolina Executive Order (S.C. Exec. Order 2021-23) stipulate that the state and local governmental units may not issue or require persons to present or have an immunization passport.

The Louisiana House Bill 349 (La. H.B. 349) specifically prohibited the inclusion of vaccination verification or immunity status for the issuance of a state driver's license or special identification card but the proposed legislation was vetoed by Governor Edwards. The basis of the veto was that the proposal was unnecessary and would do nothing to protect the health and safety of the public.

The proposed Pennsylvania Senate Bill, (Pa. S.B. 618) would prohibit a governmental agency from including information on an identification card or electronic tracking system to verify the holder received a vaccination against COVID-19. The bill was vetoed by Governor Wolf.

Publication of Records Restrictions

In Alabama, no state government entities are permitted to require the publication or sharing of immunization records for an individual (Ala. S.B. 267). The Georgia Executive Order (Ga. Exec. Order 05.25.21.01) restricts the release or sharing of immunization data from the Georgia Registry of Immunization Transactions and Services to determine the COVID-19 vaccination status of an individual for allowing privileges based on such status. The North Dakota Century Code (N.D. Cent. Code 23-12-20) restricts a state agency from publishing or sharing the vaccination record or similar health information of an individual without their authorization.

Access to Governmental Services and Premises

The states take different approaches with regards to proof of vaccination rules to access governmental services or to enter government premises. On April 5, 2021, Governor Abbott issued the Texas Executive Order (Tex. Exec. Order No. GA-35) that prohibited state agencies from adopting rules requiring a person to provide documentation regarding their vaccination status. According to the Alabama law (Ala. S.B. 267), the Arizona Executive Order (Ariz. Exec. Order 2021-09), the Idaho Executive Order (Idaho Exec. Order No. 2021-04), the Montana Executive Order (Mont. Exec. Order No. 7-2021), the South Carolina Executive Order (S.C. Exec. Order 2021-23), the Tennessee Senate Bill (Tenn. S.B. 858), the Wyoming Executive Directive (Wyo. Exec. Directive 5-7-2021) and Georgia Executive Order (Ga. Exec. Order 05.25.21.01), no governmental agency is permitted to require documentation, certification or proof of immunization, COVID-19 vaccination status or implement a vaccine passport program as a condition to enter governmental premises or receive a government service.

The Iowa statute has a similar provision; however, the law permits the governmental agency to implement a COVID-19 screening protocol so long as the procedure does not require proof of vaccination for COVID-19 (Iowa H.F. 889).

The proposed Delaware House Bill (Del. H.B. 209) bars state agencies from requiring a person to prove their vaccination against COVID-19 to access an area of service that is open to the public. The North Dakota Century Code (N.D. Cent. Code 23-12-20) stipulates that state agencies may not require documentation, whether physical or electronic, for the purpose of certifying the vaccination status of an individual, the presence of pathogens, antigens or antibodies or their post-transmission recovery status. The New Hampshire Statute (N.H. Rev. Stat. Ann 141-C) and

South Dakota Executive Order (S.D. Exec. Order 2021-08) indicate that no governmental entities may compel or require a person to receive an immunization or vaccine passport for COVID-19 in order to receive or access a public facility, public benefit, public service or do business with the government.

The proposed Pennsylvania Senate Bill, (Pa. S.B. 618) barred a governmental entity from requiring proof of vaccination against COVID-19 in order to use any service, enter any building or undertake any activity within the jurisdiction of the state. The bill was vetoed by Governor Wolf on the basis that the bill impedes basic public health measures, creates risks for residents of long-term care facilities and inhibits the ability to collect vaccine and immunization information (Pa. Gov. Wolf Veto Message).

In contrast, the Hawaii Executive Order (Haw. Exec. Order No. 21-07) requires contractors and visitors to provide their vaccination or testing status as a condition of entry onto State property and into State facilities.

Access to Business Goods and Services

Proof of vaccination in the private sector varies by the jurisdiction. According to the Alabama law (Ala. S.B. 267), businesses may not refuse to provide goods or services based upon the immunization status of the customer. The Iowa statute has a similar provision; however, the law permits a business to implement a COVID-19 screening protocol so long as the procedure does not require proof of vaccination for COVID-19 (Iowa H.F. 889). Under the Florida Executive Order (Fla. Exec. Order No. 21-18), the Montana Executive Order (Mont. Exec. Order No. 7-2021) and the North Dakota Century Code (N.D. Cent. Code 23-12-20), businesses are not permitted to require patrons or customers to provide any documentation certifying COVID-19 vaccination or post-transmission recovery to gain access to entry or receive services from the business.

According to the Tennessee Senate Bill (Tenn. S.B. 858), the government is not permitted to obligate a private business to require a proof of vaccination as a condition for a person to enter or utilize the services of the business.

The Arizona Statute (Ariz. S.B. 1824) prohibits the state from requiring a business to obtain proof of COVID-19 vaccination status of any patron in order to enter a business establishment.

Taking an opposite approach, the New York City Emergency Executive Order (New York City Emer. Exec. Order No. 225) directs certain covered entities to deny entrance to a patron, full and part-time employee, intern, volunteer, or contractor to enter covered premises without displaying their proof of vaccination.

Right to Personal Choice

The Alaska Administrative Order (Alaska Admin. Order No. 321), the Arizona Executive Order (Ariz. Exec. Order 2021-09), the Idaho Executive Order (Idaho Exec. Order No. 2021-04) and the Georgia Executive Order (Ga. Exec. Order 05.25.21.01) afford a citizen the right to choose and the opportunity to receive a COVID-19 vaccination and determine precautionary behaviors for themselves. According to the Wyoming Executive Directive (Wyo. Exec. Directive 5-7-2021), the order considers the opportunity to become vaccinated as a matter of personal choice based upon personal circumstances.

Travel Programs

The Alaska Administrative Order (Alaska Admin. Order No. 321) and the Georgia Executive Order (Ga. Exec. Order 05.25.21.01) clarify the policy that no state entity may require any person to produce their personal vaccine history or vaccine passport in order to travel to or within their respect states.

Under the provisions of the Hawaii Emergency Proclamation (Haw. Emer. Proc. 08.05.2101), all persons entering the State of Hawaii are subject to the mandatory screening process and completion of mandatory documentation regarding the COVID-19 Screening Process and Travel Self-Quarantine Rules. The Hawaii Office of the Governor announced the launch of a vaccination exception program. Domestic travelers vaccinated in the United States can by-pass the Hawaii quarantine requirements with proof of their vaccination. Travelers are allowed to attest and upload their vaccine document onto Safe Travels program for screeners to verify at the airport gate.

Condition of Employment

The states take different approaches regarding conditions of employment. According to the Georgia Executive Order (Ga. Exec. Order 05.25.21.01), no state employee is subject to different rules or requirements than other employees based solely on their COVID-19 vaccination status if actual proof of vaccination status is a qualification for privileges. Furthermore, vaccination status is not a condition of state employment in Georgia.

According to the North Dakota Century Code (N.D. Cent. Code 23-12-20), a state agency may not require a private business to obtain documentation, whether physical or electronic, to certify their vaccination status, the presence of pathogens, antigens or antibodies or their post transmission recovery status before employment of a candidate.

In contrast, the Hawaii Emergency Proclamation (Haw. Emer. Proc. 08.05.2101) requires state and county employees to attest to their vaccination status. Unvaccinated state and county employees are subject to regular COVID-19 testing. According to the Virginia Executive Order (Va. Exec. Order No. 18-2021), executive branch employees and state contractors are required to disclose their vaccine status by completing a vaccination attestation form or be subject to weekly testing and masks wearing.

Right of Private Business

The states take several different approaches to the regulation of vaccine documentation. The Alaska Administrative Order (Alaska Admin. Order No. 321) stipulates that the vaccine policies do not infringe on the rights of private businesses. The Arizona Executive Order (Ariz. Exec. Order 2021-09) prohibits state governmental agencies from requiring businesses to request documentation or proof of vaccination status from individuals.

The Montana Executive Order (Mont. Exec. Order No. 7-2021) and the Florida Executive Order (Fla. Exec. Order No. 21-18) do not restrict businesses from instituting COVID-19 screening protocols and industry best practices to protect public health. However, businesses in these states cannot require customers to produce COVID-19 vaccination documentation.

Healthcare Institution Exemption Provisions

The Arizona Executive Order (Ariz. Exec. Order 2021-09) does not limit the ability of a healthcare institution from requiring documentation of a patient, resident, employee, or visitor. However, the Arizona Statute (Ariz. S.B. 1824) is narrower in scope by enabling the health care institution to require the institution's employees to be vaccinated.

According to the Iowa statute (Iowa H.F. 889), health care facilities are not subject to the ban on mandatory disclosure of vaccination status. Under the provisions of the Texas Executive Order (Tex. Exec. Order No. GA-35), the Montana Executive Order (Mont. Exec. Order No. 7-2021) and the South Dakota Executive Order (S.D. Exec. Order 2021-08), nursing homes, long-term care facilities, and assisted living facilities retain the ability to require documentation of the vaccination status for the COVID-19 vaccine of their residents. The North Dakota Century Code (N.D. Cent. Code 23-12-20) ban on COVID-19 vaccination credentials does not apply to health care providers including long-term care providers. Similarly, the New Hampshire Statute (N.H. Rev. Stat. Ann 141-C) does not apply to county nursing homes, state hospital, or other medical facilities operated by the state.

Health Care Agent Exemption Provisions

The New Hampshire Statute (N.H. Rev. Stat. Ann 141-C) does not limit treatment decisions by a guardian over a person, a surrogate decision maker, of a designated durable power of attorney for health care.

Educational Exemption Provisions

State laws permit schools to require vaccine passports. According to the Arizona Executive Order (Ariz. Exec. Order 2021-09), the law does not limit the ability of a childcare center, a school or a university from requiring the vaccination records of a student. The North Dakota Century Code (N.D. Cent. Code 23-12-20) exempts the state board of higher education, the university system, and institutions under the control of the state board of higher education from compliance with the ban on COVID-19 vaccination records.

The Illinois statute (110 Ill. Comp. Stat. Ann. 20/2) affirmatively states that no person is permitted to attend a post-secondary educational institution without presenting proof of immunization against communicable diseases. The propose legislation for the Commonwealth of Massachusetts (Mass. S.B. 2499) would require COVID-19 vaccine immunization for all students and employees on every campus enrolled in on-campus learning at community colleges. The proposed bill was referred to the Joint Committee on Higher Education.

States also address exemptions from proof of vaccination for religious objections and for medical reasons. The Utah Statute (Utah Code Ann. 53B-2-112) approach differs from these examples. The Utah law implies that an institution of higher education may require proof of vaccination. However, the Utah law stipulates that the institution may not require proof of vaccination as a condition for enrollment or attendance unless the institution also allows medical, personal and religious exemptions.

The proposed Pennsylvania Statute, (Pa. S.B. 618) restricted institutions of higher education from requiring proof of vaccination against COVID-19 to use any service, enter any building or undertake any activity owned by the institution. However, the bill was vetoed by Governor Wolf on July 1, 2021. According to the New Jersey Executive Order (N.J. Exec. Order No. 253), workers in preschool through secondary schools must provide adequate proof of full vaccination or submit to weekly COVID-19 testing. The proof of vaccination requirement includes the CDC COVID-19 Vaccination Card or an electronic copy, an official record from the New Jersey Immunization Information System, or a record from a health care providers portal/ medical record system or a military immunization record. The order also permits proof of vaccination status by a docket mobile phone application record or a state specific application that produces a digital health record.

Health Department Investigations

In the Arizona Executive Order (Ariz. Exec. Order 2021-09), the health department is authorized to require an individual to provide documentation of their COVID-19 vaccination status during a COVID-19 outbreak investigation.

Disaster or Emergency Exception

According to the North Dakota Century Code (N.D. Cent. Code 23-12-20), the ban on COVID-19 vaccination records is not applicable during a public health disaster or emergency.

Disclosure of Status

According to the Arizona Executive Order (Ariz. Exec. Order 2021-09), an individual cannot be compelled by a governmental entity to disclose their COVID-19 vaccination status, because the vaccination status of an individual is considered private health information. The Georgia Executive Order (Ga. Exec. Order 05.25.21.01) indicates that the COVID-19 vaccination records of an individual are private medical information. The proposed Minnesota Senate Bill (Minn. S.B. No. 1589 would prevent the mandatory disclosure of health status by requiring a person to display a symbol, card or any other indicator that the individual has antibodies for a communicable disease.

The Wyoming Executive Directive (Wyo. Exec. Directive 5-7-2021) orders state agencies not to release private patient information such as COVID-19 vaccination status without the explicit consent of the patient or their parent or guardian.

The Virginia Executive Order (Va. Exec. Order No. 18-2021) takes a contrasting approach that requires executive branch employees and state contractors to disclose their vaccine status or undergo weekly COVID-19 testing.

Marine Travel

The Alaska Administrative Order (Alaska Admin. Order No. 321) acknowledges the right of the Marine Highway ferry system to inform passengers of the voluntary choice of the passengers to provide proof of vaccination and avoid the need for a negative test to board a vessel.

Individual Access to Medical Information

Both the Arizona Executive Order (Ariz. Exec. Order 2021-09) and the Arizona Statute (Ariz. S.B. 1824) do not limit the ability of an individual to request their own vaccination records or request that their vaccination records be provided to a designated third party.

The Florida Executive Order (Fla. Exec. Order No. 21-18), Idaho Executive Order (Idaho Exec. Order No. 2021-04) and the Montana Executive Order (Mont. Exec. Order No. 7-2021) affirm the right of individuals to access their own personal health information. According to the Georgia Executive Order (Ga. Exec. Order 05.25.21.01), individuals cannot be denied access to their vaccination records from their medical providers. The North Dakota Century Code (N.D. Cent. Code 23-12-20) preserves the right of an individual to access their own personal health information and the health details of others which the person has a right to access.

Immunization Information

The Idaho Executive Order (Idaho Exec. Order No. 2021-04) confirms that the law does not limit the normal operation of the existing Immunization Reminder Information System of the state. Under the provisions of the Indiana House Enrolled Act No. 1405 (2021 Ind. Acts 1405), the state and local governmental units are authorized to maintain, create and store medical records of immunization status for the purpose of public health information and provide a person and their medical provider with a copy at the time of their vaccination. The Montana Executive Order (Mont. Exec. Order No. 7-2021) permits the normal operation of the existing Immunization Information System of the state.

Grant Eligibility

The Florida Executive Order (Fla. Exec. Order No. 21-18) appears to be the only state law that requires compliance with the COVID-19 passport restrictions for businesses in order to be eligible for grants or contracts funded through state revenue.

Regulatory Compliance

The New York City Emergency Executive Order (New York City Emer. Exec. Order No. 225) requires a specified entity to develop a record describing their COVID-19 vaccine passport protocol that is available for inspection by a City official. In addition, the entity needs to post a sign in the entrance of the establishment alerting patrons to the City vaccination requirements.

Civil Damages

The proposed New Jersey Assembly Bill (N.J. A. 5609) would prohibit a governmental agency or business from requiring an individual to show proof of a COVID-19 vaccination. If a defendant is found liable for a violation of the proposed law, the victim would be entitled to civil damages in the amount of ten thousand dollars.

According to the New York City Emergency Executive Order (New York City Emer. Exec. Order No. 225, the penalty for failure to comply with the vaccine passport law is a fine not less than $1,000 and $2,000 for a subsequent violation.

Disciplinary Action

Under the provisions of the Hawaii Emergency Proclamation (Haw. Emer. Proc. 08.05.2101), the attestation of COVID-19 vaccination status and testing requirements for State and county employees are enforceable through disciplinary action up to and including termination for failure to comply. The New York City Emergency Executive Order (New York City Emer. Exec. Order No. 225 directs the Commissioner of the Department of Health and Mental Hygiene to designate an agency to enforce the directives of the law.

Determination of Age, Medical Condition, Religious Objection

The provisions of the Idaho Executive Order (Idaho Exec. Order No. 2021-04) recognize that some individuals are unable to receive a vaccine because of their age, medical condition or religious objection.

Resolution of Conflicts

In the event of a conflict in existing laws, ordinances, orders, rules and regulations, the Arizona Executive Order (Ariz. Exec. Order 2021-09) suspends the existing state governmental authority during the time and to the extent that they conflict. The Idaho Executive Order (Idaho Exec. Order No. 2021-04) authorizes various executive branch entities to take steps to rescind, alter, or suspend existing administrative rules in conflict with the Executive Order.

Discretionary Authority

Under the provisions of the Arizona Executive Order (Ariz. Exec. Order 2021-09), the Department of Health Services is authorized to coordinate all matters pertaining to COVID-19. The South Carolina Executive Order (S.C. Exec. Order 2021-23) authorizes the Department of Health and Environmental Control to provide any guidance, rules, regulations, or restrictions regarding the application of the emergency measures to prohibit vaccine passports. A provision in the New Hampshire Statute (N.H. Rev. Stat. Ann 141-C) establishes a committee to examine the policy of medical intervention including immunization and report its findings to the state senate, house of representatives and the governor.

The provisions of the Louisiana House Bill 349 (La. H.B. 349) would direct the Department of Public Safety and Corrections to enforce the prohibitions but the proposed legislation was vetoed by Governor Edwards. According to the Virginia Executive Order (Va. Exec. Order No. 18-2021), the Department of Human Resource Management is charged with the responsibility to issue policies, procedures, and guidance to implement the vaccine requirement.

DISCUSSION

The requirements for a vaccine passport are determined by the particular jurisdiction. Research findings demonstrate a divergence in state viewpoints on the development of COVID-19 vaccine passports and the banning of vaccine passports.

With the onset of the pandemic, the federal government encouraged citizens to receive the COVID-19 vaccine and retain a vaccination card for future reference. Research findings show that most state laws afford a person the right to choose to receive the COVID-19 vaccines. On September 9, 2021, the White House announced that COVID-19 vaccinations would be required for certain federal employees, for employers with more than 100 workers, and for companies with federal contracts.

In response to the pandemic, businesses and other entities have also established COVID vaccination and proof of vaccination policies and practices. Paper and digital documents are becoming available to verify proof of vaccination. Smartphone-based apps are now available. On August 11, 2021, the Illinois Department of Public Health (IDPH) launched an immunization portal allowing individuals to verify their COVID-19 vaccination record. In addition to the standard CDC COVID-19 Vaccination Record Card, the New York City Emergency Executive Order (New York City Emer. Exec. Order) No. 225 permits the proof of vaccination to be established by the display of a New York City COVID Safe Pass. The instrument is available to download on Apple and Android smartphone devices or a New York State Excelsior Pass. California provides a service for an individual to retrieve a digital copy of their vaccination information through Digital COVID-19 Vaccine Record.

The Arizona laws are unique because Governor Ducey signed an Executive Order (Ariz. Exec. Order 2021-09) on April 19, 2021. Subsequently, the Arizona legislature passed a health budget reconciliation bill (Ariz. S.B. 1824) that contained a provision prohibiting the state from establishing a COVID-19 vaccine passport which was signed by Governor Ducey.

The state laws that ban vaccine passports propose that the determination of vaccination is a personal choice. If a vaccine passport program were to be implemented, the mandate would violate a person's medical privacy rights,

prejudice and exclude individuals, cause division and be counterproductive (Idaho Exec. Order No. 2021-04). The COVID-19 vaccine passports may reduce individual freedoms necessitating governmental intervention to protect fundamental rights (Fla. Exec. Order No. 21-81).

The study findings demonstrate the approach that several state administrations take in formulating policies regarding the COVID-19 vaccine passport concept. Rather than vetting the issues in the official legislative bodies, the gubernatorial executive orders have been initiated under the authority of emergency powers. Although the process is expediate, the numerous issues related to vaccination passports are not always addressed. The absence of many tangential concerns is evident. When communication takes place through the legislative process, more comprehensive details may be identified and refined. Although Iowa enacted legislation, the law contains broad general topics and few specifics (Iowa H.F. 889).

Most of the legislative or executive initiatives address the mandatory disclosure of COVID-19 vaccination status but the laws do not mention voluntary disclosure of proof of vaccination.

Underlying state laws vary in the explanation of the approach to vaccination passports. While some states explain the justification for enacting laws that address COVID-19 vaccination status, other state provisions do not indicate the basis for passing legislation or taking executive action.

A Michigan Legislative Analysis of House Bill 4667, Mich. Leg. Anal. H.B. 4667 was prepared for the Michigan House of Representatives indicating that several versions of vaccination passports are currently in the developmental stage in the United States. According to the findings in the analysis, several arguments are made for legislation to ban vaccination passports. These justifications include the possible violation of basic fundamental rights, the creation of a two-tiered culture, the exclusion from goods or services, the risk of data breaches and the potential for discriminatory governmental practices. Proponents that support a government ban assert that vaccine passports undermine individual liberty and personal privacy. In addition, vaccine passport programs would restrict travel, speech and the right to association and confer social privilege on the basis of fitness.

Several arguments were also identified in the Legislative Analysis against legislation which bans vaccination passports. These points include the chilling effect on private companies that rely on government databases for information on vaccination status. Another concern is the possible negative affect if other jurisdictions restrict entry to those without proof of vaccination. Opponents of legislative bans may also argue that the passport ban could limit emergency response to new health threats.

States do not take consistent approaches on the scope of services under consideration with vaccination passports. Some states only limit the authority of the state or local agencies from requiring the submission or proof of immunization status by individuals. Other state laws are broader and encompass bans on private businesses and government agencies from requiring the submission or proof of vaccination status.

The proscribed laws seem to contradict existing government programs. Several of the laws prohibit the publishing or sharing of an individual's COVID-19 vaccination status but permit the continual normal operation of their existing immunization information systems for other types of vaccine information.

The state laws suggest that the decision to receive a COVID-19 vaccine should be determined by personal choice but the decision to ban vaccination passports is dictated by state mandate. These approaches seem to be inconsistent.

While some states have enacted laws or issued executive orders that preemptively ban the use or development of vaccine passports, other state executives have publicly made statements either in opposition to vaccination passports or vetoed proposed legislation to ban them.

Several states that prohibit vaccination passports provide exemptions from the restriction by educational institutions. The State of Illinois provides an interesting controversy over the proof of COVID-19 vaccination. On July 12, 2005, the state enacted the College Student Immunization Act that affirmatively conditions attendance at a post-secondary educational institution on the presentation of proof of vaccination. The statute was broad and addressed the pre-pandemic era. The scope of the access to governmental services and premises varies among the state laws. The proposed Delaware House Bill (Del. H.B. 209) legislation would encompass any areas of governmental services that

are open to the public including school districts, charter schools or any recipient that receives $10 million or more from the state.

Health care decisions are customarily made by considering generally accepted health care standards. When a new disease such as COVID-19 occurs, the medical community seeks to arrive at a consensus on the best practices. The general population tends to make decisions based upon the right of self-determination and the right of patient autonomy. When medical standards are established, providers and consumers can make more informed decisions. To further complicate the situation, ongoing research generates revisions in best practices. Thus, we see the mixed responses and reactions in the general population and among our elected officials. Refusal to rapidly adjust to the evolving standards may cause confusion, frustration and disharmony.

The Arizona Executive Order details a thorough and comprehensive approach to the documentation of COVID-19 vaccination status for individuals (Ariz. Exec. Order 2021-09). The Executive Order ensures the availability of vaccines but recognizes the personal choice of individuals to accept or refuse vaccinations. The Order prohibits state governmental agencies from requiring a business to compel an individual to provide documentation of COVID-19 vaccination status to receive services or enter a building or business.

The vaccine passport statutes give the individual the option to decide for themselves whether vaccination is appropriate. The individual may review information that the person trusts. An individual can confer with their provider and determine the proper care in accordance with the desires of the patient. The individual can assess the risks and benefits of the available treatment options. Ultimately, the choice is made by the individual.

The vaccine passport statutes vary by jurisdiction and may not be uniform in scope. Fundamentally, the underlying right to choose treatment is made by the individual in consultation with the individual's health care provider (Cameron, 2020).

The state statutes make vague reference or the lack of reference to health care standards. These vaccine passport statutes indicate that the health care decisions of the individual are required with no reference to generally accepted health care or medical standards.

Treatment decisions are typically made between the patient and the physician under the doctrine of the right of self-determination (Cameron, 2020). The concept enables the person to exercise the right of self-determination. In a typical health care arrangement, the patient develops a relationship with the physician before a course of treatment is determined. The patient selects the treatment from among alternatives identified by the physician. Once the patient is informed by the physician, then the individual assumes responsibility for their own health care decisions.

Under this model, the best interests of the patient are maintained. Many health care statutes contain provisions to address the best interests of the patient, the use of due care and to act with good faith compliance (Cameron, 2020). The vaccine passport legislation lacks these extra safeguards for the patient.

The vaccine passport statutes afford the individual the choice to make a careful judgment of the best option for themselves with an understanding of the risks associated with that choice. The vaccine passport laws take into consideration the risks and benefits of promoting or inhibiting the establishment of a statewide vaccination status policy.

In the case of COVID-19 vaccination requirements, private entities need to consider the health and well-being of the stakeholders including employees, customers, extended families, and others. Private entities may look to the state government for guidance in public health matters. However, the state vaccine passport laws provide limited advice on mitigating and preventing the spread of COVID-19 infection.

Implications

The state authority to oversee COVID-19 requirements has been evolving throughout the course of the pandemic. The short and long-term effects of the decisions are uncertain. The federal government has been tracking certain data. The Vaccine Adverse Events Reporting System is a system managed by the Centers for Disease Control and Prevention and the U.S. Food and Drug Administration. These federal agencies analyze reports of adverse events after a person

has received a vaccination (VAERS, 2021). Under the program, healthcare providers and manufacturers are required to report adverse events related to vaccinations. However, the tracking process is a "passive reporting system" depended on recipients self-reporting their personal experiences (VAERS, 2021). To implement the tracking framework, the stakeholders will need to communicate effectively so that the federal agencies have a thorough understanding of the potential benefits and risks of COVID vaccination.

Many social implications are associated with the proposition for a vaccine passport. Privacy, security of data, eligibility, health and safety are primary.

In many venues, the unvaccinated individuals are required to be tested periodically. The Centers for Disease Control and Prevention encourages employers to communicate information on COVID infections to the appropriate health department. However, the responsibilities, capacities and authority of the particular health department may vary depending on the jurisdiction (CDC, 2020). Testing service providers are responsible for implementing cybersecurity measures for the protection of personal data.

To improve the health care guidelines, the statutes may mandate that the state medical licensure boards develop clinical review criteria for patients with special needs. The statutes may specify provisions for clinical guidelines to address matters of atypical patient populations. Vaccine passport laws may require further modification to clarify certain situations. One of the criteria that requires more specificity is the exceptions process for patients with special needs. The treatment plan criteria for special needs may have already been predetermined and based on current standards of direct patient to physician contact. The statutes may require relevant patient protection measures that address safeguards for patients with physical impairments and special needs.

The statutes may stipulate standards to integrate the vaccine passport documents with the electronic medical record. This mechanism would enable the patient to communicate their preferences to others. The digital record of the vaccine credentials would enhance the ability of the individual to convey their vaccination status. The information tool would create a platform to retain the relevant information.

The state health departments may consider establishing a vaccine passport hotline. This resource would provide guidance and answer questions related to the operation of the vaccine credentialling process.

The state health department may develop or assist health providers in developing in-service vaccination training modules for employees. The shared information may raise the level of awareness for the vaccine passport process.

At the county level, an administrative agency could provide a centralized registry to serve as a clearing house for persons to submit their vaccination documents. The registry would be accessible for health care providers to query for vaccination status information.

The laws may address annual filing requirements to report the frequency of booster shot encounters to the health department and the state medical licensure board. The statutes may require the prescribing practitioner to demonstrate with sound clinical evidence that the individual understands the risks, benefits, and alternatives to vaccination.

As discussed in this paper, few state statutes set forth the duties and responsibilities of physicians in the vaccination passport protocol. The provider may encounter a situation that could expose the patient receiving a vaccination to potentially risky and ineffective treatments. The exposure may lead to a potentially harmful outcome. Should a conflict occur between the requirements of the employer or state and the patient's best interests, the physician may require clear guidance to resolve the conflict. Most of the vaccine passport statutes in the study leave the options to these dilemmas unaddressed in the law.

Limitations

The scope of research in this paper is limited to an analysis of state legislative and administrative actions concerning the regulation of COVID vaccination verification and status. The research does not provide an analysis of related constitutional concerns. This analysis does not address masking, testing, nor vaccination efficacy and safety. Issues concerning vaccination mandates in this project are limited to a review of the state legislative and administrative

actions and does not address municipalities or federal mandates. The paper does not address accommodations, natural immunity, contract tracing and accessibility.

The depth of research is further limited because of the ongoing legislative and executive activity associated with the COVID vaccination topic. The research studied a sample of state laws during a limited time frame ending on October 1, 2021.

FUTURE CONSIDERATIONS AND CONCLUSION

All the regulatory and legislative initiates in this review concerning vaccination passports are limited exclusively to COVID-19 immunization status. Future research may consider whether vaccine passports have a utility for identifying the immunization status for other types of disease or illness. If centralized data banks are created for COVID-19 vaccination status, additional data could also be stored, maintained and available for retrieval. The retrieval of archived health information is important for the patient, the health care providers and for public health initiatives.

The state approaches may consider incentive-based models that encourage vaccine passport involvement by the various stakeholders including the health care providers, the consumers, companies, and local communities.

The state laws do not suggest alternative methods to reveal COVID-19 vaccination status. Basically, COVID-19 vaccination credentials are simply an extension of routine health status documents.

The state laws are designed with the assumption that government-issued vaccination passports are the primary platform and yet, the private business community appears to be the dominant player. Research and surveys may encourage the input of a wider range of stakeholders in the debate of vaccination passport requirements.

The policies that are initiated by the states may consider the public health needs of the community. Because of the nature of the pandemic, the concept of community needs to be defined. Community can be difficult to target for the COVID-19 virus can spread locally, regionally, statewide or nationally. Managing a pandemic can also be difficult. The spread of the COVID-19 virus creates its own pathways. Communities may attempt to mitigate the impact of the illness but without community support, the best policies may elude positive results.

Consistent with the *National Strategy for the COVID-19*, clear channels of communication with state and local leaders need to be encouraged in order to execute a unified COVID-19 response.

The findings of the study demonstrate that states recognize the right of citizens to travel between states, the freedom to make personal health choices, and to preserve the rights of private businesses through the execution of administrative orders, executive orders, and statutory action. With proper safeguards which balance the interests of the individual and the state compelling interests, reasonable approaches may be achieved to maintain these principles.

A competent adult should have the right to make their own health care decisions without the need for third party intervention. If reasonable accommodations are available for the unvaccinated individual, societal interests may be protected. This approach respects the rights of the person but also respects the safety, health, and well-being of the community.

Future research may examine aspects related to conflicts and the level of responsibility between federal, state, and local public health laws and regulations of vaccination passports.

The tracking of incidents of noncompliance with vaccination passport restrictions may be considered.

The impact that the vaccination passports have on the quality of population health should be considered in future research including measures of performance and state metrics. The results of these public health measures by the medical community need to be documented in the medical literature for the advancement of science.

Research may address the ability of vaccination passport programs to improve safer workplace environments for employees.

Governmental laws will need to be constantly updated to reflect the advances in the fields of medicine and science to mitigate the spread of communicable diseases. If the COVID public health crisis continues, future governmental laws and decisions will need to have a rational basis to the public health and safety of society.

Federal, state and local governments have a shared responsibility to protect the public health of its citizens. Therefore, collaboration among the states and the federal government are essential because communicable diseases affect everyone.

Research may study the reasons for opposition to vaccination passports. Governmental laws will need to be carefully drafted to prevent infringement on individual rights. Public health evidence may influence the determinants of vaccination passports.

Further research is needed to determine if the practice of issuing vaccination passports provides efficiency in the delivery of care and serves the best interests of the public. Continuous outreach and communication are required to provide evidence-based findings. Leaders need to display understanding and support to promote the benefits of vaccination. Our society has a vulnerable segment of our community. In this situation, the vulnerable segment represents the unvaccinated.

The delegating of authority may require ongoing monitoring and training of public health personnel and community members on the effectiveness of vaccine passports.

The individual may be coerced into making vaccination decisions despite the possibility of exposure to unforeseeable risks and unintended consequences. Therefore, the administrative agencies responsible for the formulation of public health policies may uphold the right of individuals to make their own autonomous health care decisions that are independent from third party influence.

Courts have long recognized the special relationship between the patient and the physician as well as the right of the community to protect itself. Future statutory frameworks need to balance these principles.

Public policy needs to assure that the right of the individual to make health care decisions regarding vaccination status is not limited by legislative changes in the law. Our society has championed the principles of the patient-physician relationship and the patient right of self-determination (Cameron, 2020). Our social policies should always preserve these patient rights and afford an individual the opportunity to make informed health care decisions.

Communicable disease prevention and control is a public health imperative. In order to advance the public health and safety of our communities, societal barriers need to be addressed through an integrated approach. As noted in the opinion by Judge Leichty, “vaccines address a collective enemy not just an individual one.” Public policy will prevail by balancing the state interests and individual rights in the fight against COVID-19.

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EXAMINING THE IMPACT OF SOFI STADIUM ON LOCAL PROPERTY PRICES USING SOCIO-ECONOMIC STRATIFICATION, DATA ANALYTICS, AND THE ZILLOW ZTRAX DATABASE

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ABSTRACT

In February of 2016, Stan Kroenke – the owner of the Los Angeles Rams – argued that the construction of the team's new stadium in Inglewood, California would, with a $5.5 billion price tag, create a "ripple effect so profound" that it would "boost the neighborhood's subpar property values along the way." Kroenke made his point while ignoring what an increase in property value can produce through such a gentrification process: marginal damage to the local education system as neighborhoods skew towards higher-income residents, the depletion in long-term viability and supply of "low-cost housing," and the "deepening class polarization" within the neighboring urban housing markets are among just some of the chief concerns. To examine Kroenke's claims and the underlying socio-economic issues, this paper uses the Zillow's proprietary ZTRAX database to, first, construct a standard difference-in-differences model to explore whether the construction of SoFi Stadium did indeed boost the neighborhood's property values. After, by using the `tidycensus` package in the R programming language, socio-economic factors will be explored at both the county subdivision and census tract levels.

INTRODUCTION

The impact of sport franchises and their respective stadiums on neighboring communities has long been debated. Proponents argue that stadiums, if built new, not only create construction jobs in the short term, but also create additional revenues in the communities, create hospitable areas for new businesses, and ultimately attract tourists in the long term (Tu, 2005). Case in point, and of specific interest to this research, is the owner of the Los Angeles Rams, Stan Kroenke, arguing that the construction of SoFi Stadium in Inglewood, California would result in a "ripple effect so profound" that it would "boost the neighborhood's subpar property values along the way" (Ligato, 2019). Kroenke makes his point while ignoring what an increase in property value can produce through such a gentrification process: marginal damage to the local education system as neighborhoods skew towards higher-income residents, the depletion in long-term viability and supply of "low-cost housing," and the "deepening class polarization" within the neighboring urban housing markets are among just some of the chief concerns (Murdie & Teixeira, 2011; Newman & Wyly, 2006). Indeed, those weary of the relationship between sport franchises and neighboring communities contend that not only are the revenues generated by the stadiums not spent locally but not enough businesses are attracted to justify the cost and that, as a result, the local community is ultimately harmed.

At a cost of $5 billion, SoFi Stadium stands as the most expensive stadium ever built and will host the 2022 Super Bowl, the 2023 NCAA football championship game, and the opening and closing ceremonies of the 2028 Los Angeles Olympic Summer Games. As well, Korenke plans to build a "massive entertainment, retail, commercial, and residential development" complex on approximately 300 acres surrounding the stadium that was previously home to the Hollywood Park racetrack. By July 2017, shortly after the groundbreaking of the stadium, online real estate listings in the city of Inglewood were already using the promise of SoFi Stadium to help sell houses. More than half of some 80 listings explored by *LA Curbed* in July of 2017 mentioned either the stadium or the entertainment and commercial complex being planned around it. Indeed, one of the listings included just an "exterior shot of a three-bedroom home and a flashy rendering of the future stadium, as if buying a house in Inglewood were equivalent to snagging a seat on the 45-yard line" (Chiland, 2018).

The socio-economic impact of SoFi Stadium's construction cannot be ignored either. Inglewood, as a city, was ultimately shaped by racist housing policies. As part of the Great Migration, many Blacks found new homes on the West Coast, particularly in areas such as Long Beach and South-Central Los Angeles. However, redlining – or the deeming as "hazardous" to lenders those areas because of racial and ethnic demographics – made loans for minorities virtually impossible to receive (Jan, 2018). It was not until white flight, caused by the Watts riots of 1965, did white residents move "to more conservative outskirts like Orange County" (Coleman, 2020). The white flights to Marina del Rey, Playa Vista, and other upscale and non-Black communities, was a "decisive moment in the city's racial history" as it was now "populated by African Americans" with Hispanics quickly moving into the enclave as well. This population change ultimately shifted the demographic makeup in the city, including income, housing, and education. No longer was Inglewood considered a "white upscale community." Rather, it was shifting towards being categorized as a "ghetto" by outside observers. By the early 1980s, the impact of Proposition 13 engulfed Inglewood.

The outcome of Proposition 13, which "capped funding for public schools and other services," indirectly led to the city's "crack cocaine epidemic overseen at the street level by burgeoning gangs." As well, the demographic racial makeup of the city shifted, being "reshaped by waves of immigrants coming from war-torn Central America and Mexico" (Kaplan, 2020). The results of Proposition 13 also resulted in the citizens of Inglewood finding great difficulty in obtaining assistance from state and federally funded community-based assistance programs. Of utmost concern was the inability to source the necessary funding for affordable housing, immediately placing the program at risk. The location of SoFi Stadium and the amenities to soon come with it are likely to create a gentrification process in Inglewood, forcing a "displacement of minorities living within the city" (Inglewood Public Library, 2019).

The city ultimately came to be characterized as one with "boarded-up storefronts, widespread poverty and unemployment, rampant disorder, and high rates of violent crimes." By the mid-1990s, Inglewood claimed the 14th highest murder rates in the United States among those cities with a population of at least 100,000. As well, Inglewood's school district was "virtually bankrupt" and its buildings were "considered to be "decrepit, rat infested, underperforming, underfunded, and understaffed." However, the construction of SoFi Stadium and the conversion of the land previously home to the Hollywood Racetrack to mixed-use real estate that is set to include retail and office space, hotels, casino, and an entertainment complex, has allowed Inglewood, the city that hip-hop icon Dr. Dre deemed was "always up to no good," to be positioned to become the country's "next global city" (Taboada, 2020).

It is likely that Inglewood is in the earliest staged of gentrification – a phenomena concisely defined by Smith (1996) as the process whereby "poor, urban, and working-class neighborhoods" get "rejuvenated through a sudden increase of private capital investment and an influx of middle-class residents." Indeed, the term "gentrification" is a loaded concept, often pieced together from local governments under the auspices of "revitalization, renaissance, regeneration, renewal, redevelopment, rejuvenation, restructuring, resurgence, reurbanisation, and residentialisation." All are part of the "alliterative governmental garble" that attempts to hide the true capitalist-city-building ideals behind gentrification which is nothing more than the "transformation of a working-class or vacant area of a city into a middle-class residential and/or commercial use" area (Daniyelyan, 2020; Slater, 2009). One of the most common impacts of gentrification is the "demolition of old apartment rentals and the construction of new high-rise commercial buildings" (Greene, 2015). Moreover, gentrification is no longer simply *just* this process as outlined by Greene – that is, the destruction of distressed housing to be replaced by middle- and upper-middle class housing. Rather, and as evidenced by the ongoing process in Inglewood, gentrification now "frequently entails construction of luxury condominiums, chain stores, high-end boutiques, and corporate entertainment and tourism venues" (Boston, 2020).

Because of this, there is significant concern that these changes "will forever erase the rich history" of California's "last black enclave" (Jennings, 2019). Given the rich racial history of the city, this is especially concerning. The 2010 census indicated that nearly 93-percent of Inglewood's 109,673 citizens were either Hispanic or Black. The large influx of those immigrants in the 1980s sought Inglewood out because "housing was generally less expensive" (Dupree, 1991). The competing issues are clear. How can a historically underrepresented population continue life as usual in their "last enclave" while significant gentrification is occurring all around them? To be sure, Inglewood has long been "condemned as blighted and unsuitable for capital investment." However, as SoFi Stadium's gentrification continues unbated into otherwise majority-minority neighborhoods, capital investment firms now view these prior areas as "prime targets for redevelopment through increased private investment." Of course, the racial undertone of this type of gentrification is resulting in these existing "Black, poor, and other marginalized communities" becoming prime real estate for "whiter and more affluent residents and consumers" (Boston, 2020). Ron Daniels, the president of the Baltimore-based civil-rights group Institute of the Black World 21st Century, calls this "reverse white flight" – or the moving of white people back into the neighborhood they fled, now likely culturally and racially defined as a Black community – an "insidious onslaught" and that this type of gentrification was "rapidly displacing hundreds of thousands of Black people" (Mock, 2019).

This paper explores this contrast in two relational ways. First, to examine Kroenke's claim that SoFi Stadium would create impacts "so profound" that it would "boost the neighborhood's subpar property values along the way," I employ the use of Zillow's proprietary ZTRAX database to construct a standard difference-in-differences model to explore whether the construction of SoFi Stadium did indeed boost property values by using the R programming language to explore those properties within 5-, 10-, 15-, and 20-mile concentric circles of SoFi Stadium. By using the results of the DID model, I then calculate the rate of growth for these concentric circles based on the adjusted control and adjusted treatment. As well, I conduct a DID regression on rental unit costs to determine not only the price increase pre-and-post SoFi Stadium, but to also outline the percentage of rent burdened census tracts based on distance from

the stadium's location. Second, by using the 'tidycensus' package in R, I explore the socio-economic factors within Los Angeles County via the use of both a multi-group segregation index and a diversity gradient. The construction of the multi-group segregation indices is completed via a dissimilarity index, a modeling process that is abundantly common in the social sciences when examining the amount of neighborhood-based segregation between differing populations (Allen, Burgess, Davidson, & Windmeijer, 2015; Douglas S. Massey, Rothwell, & Domina, 2009; Napierala & Denton, 2017; Reardon & O'Sullivan, 2004; Wong, 2003). The diversity gradient allows for a more micro approach to examining segregation in Inglewood. By creating a smoothed scatterplot, I can visualize how the racial diversity of the city has changed pre- and post-construction of SoFi Stadium based on the distance, in minutes, from the stadium each Inglewood census tract is via driving time. Approaching the socio-economic factors through this modeling process permits for a nuanced view regarding whether non-minority populations (ie., white) that fled Inglewood in the 1960s and 1970s are returning because of the community's ongoing gentrification process vis-à-vis the SoFi Stadium complex.

LITERATURE REVIEW

Despite the importance of examining the relationship between professional stadiums and their impact on real estate value – for all of the reasons listed in the introduction – there has been surprisingly little academic work on the topic. That said, of the studies conducted on this topic, a vast majority of them conclude that the construction of a professional sports stadium often coincides with an increase in the value of the surrounding property value. As well, nearly all studies in this area of research make use of hedonic analysis to examine the difference in impact between those houses within close proximity to the stadium to those at further distances. The advantage to using hedonic analysis is, of course, to allow for the characteristics of the houses – square footage, number of bathrooms and bedrooms, etc. – to be held constant despite inconsistent distances.

Tu (2005) was the first to employ a hedonic analysis to examine the impact of professional stadiums on neighboring real estate values. Tu utilized the Maryland Department of Planning's publicly available GIS data to review over 35,000 individual housing transactions between October of 1992 and December 2001. In his findings, Tu argued that the construction of the Washington Football Team's FedEx field improved the value of single-family homes in the area surrounding the facility.

Conversely to Tu's results, Dehring, Depkin, and Ward (2007) examined the effect of the Dallas Cowboys' search for a new stadium site on the Dallas-Fort Worth metroplex. Using residential property sales data collected from the Multiple Listing Service (hereafter MLS), the authors employed a hedonic pricing model to determine average property values in the Arlington, Texas area decreased shortly after the new stadium location was announced. As noted by the authors, questions regarding property value as construction commenced and after the opening of the stadium remained unanswered, in no small part due to the inability to obtain data in a timely fashion for the metroplex area. As well, employing another hedonic analysis, Kiel, Mathewson, and Sullivan (2010) use the 1993 and 1999 American Housing survey to determine that NFL franchises had no significant impact on housing prices in their respective cities.

Feng and Humphreys (2018) used a spatial hedonic model to explore the impact of sports facilities in Columbus, Ohio on local residential real estate values. The study's findings indicated that both facilities – Nationwide Arena and Crew Stadium – created a net positive effect on intangible benefits that decreased as distance from the facilities increased. The data used in the study consisted of transactions completed in 2000 in the city of Columbus. Several other studies have made use of this particular dataset, including Brasington and Haurin (2006), Brasington (2007), and Brasington and Hite (2008).

As well, other studies studied the impact of professional stadiums on communities outside of real estate value. For example, Lavoie and Rodrigquez (2005) employed a customized Box-Jenkins procedure to study the impact of professional teams on the occupancy rates on hotels in Canadian cities. Using monthly data over a ten-year period, the results are somewhat ambiguous, though – and not surprisingly – the 1994-1995 NHL season lost to collective bargaining strife did show evidence of negatively impacting occupancy rates nationwide in those Canadian cities home to professional hockey franchises. Lertwachara and Cochran (2007) explored "both the short-term and long-term" financial impact to determine whether an increase in local income coincided with either the expansion or relocation or a professional sport franchise. In short, the findings found weak relationships between a city's financial concession and incentives often used to lure franchises to a city.

Similarly to Lertwachara and Cochran, Coates and Humphreys (1999) used data from the Regional Economic Information System, ranging from 1969 to 1994, to explore the relationship between professional sport franchises and the real per capital personal income in the neighboring communities. The study allowed, among other variables, for the inclusion of the movement of professional franchises from one city to another and the construction of new facilities. The findings argued that a "new sports franchise or facility" had little, if any, impact on local economic growth. Miller (2002) reached the same conclusion when exploring the impact of stadium construction in St. Louis on the local construction industry. Using an econometric model "developed to explain the time series trend of the construction industry employment," Miller concluded that "levels of employment in the construction industry were neither higher nor lower during the construction." As well, Nelson (2001) examined the effects of Major League Baseball stadium locations, concluding that development in the core business district of the city is the best option; otherwise, the stadium could result in "localized blight that dampens" the ability to collect regional income.

With a focus on the Olympic Games, Hotchkiss, Moore, and Zobay (2003) examined the impact on employment and wages in Georgia as a result of Atlanta hosting the 1996 Olympic Summer Games. Using a standard differences-in-differences technique, the authors found that hosting the Olympic Games results in a 17-percent increase in employment across the state. Feddersen and Maenning (2013) also studied the economic impact of the Olympic Games by using monthly data over 16 different economic sectors. Using a nonparametric approach to "flexibly isolate employment effect," the authors concluded – contrary to the earlier findings of Hotchkiss et al. – that "hardly any evidence" exists to support a "persistent shift" in economic change in the "aftermath of or the preparation for the Olympic Games." Any short-term effect was within the "retail trade, accommodation and food services" and "arts, entertainment, and recreation" sectors of the economy and quickly dissipated at the conclusion of the Olympic Games.

An important distinction between this research and prior studies is the use of the data provided by the Zillow ZTRAX database. No other studies made use of this database. Most previous studies relied on data from the American Housing Survey or the MLS system. Both have shortcomings. The American Housing Survey can provide data fitted only to national, state, or the 66 largest metro areas in the county. In the latter case, data is only currently available for the years of 2011, 2013, 2015, and 2017. Further, some metros have data accessible just for one or two of those years, while others cover all four. There is no consistent format to the data. As well, there is no true time series to the data to track home values over specific time periods. The MLS system provides different issues altogether. There are roughly 1,000 various MLS providers in the United States, each covering various sections of the country. While there is a movement to begin consolidating the MLS system into larger regional databases (McQueen, 2016) getting a true national snapshot of real estate value would require contacting and agreeing to terms with each MLS provider. Not only would this be cost prohibitive, the schema of the data for each individual MLS is likely to vary widely creating issues on how to manipulate large amounts of data spread across hundreds of data frames into one singular entity. The data provided by Zillow largely resolves these issues in that it is free to access once approved through the application process, can be manipulated into a time-series, can be deployed to explore both at the macro level (ie., state) to the micro level (ie., neighborhoods), and is overwhelmingly robust in both its accuracy and totality.

DATA PREPARATION & METHODOLOGY

The ZTRAX data used in this study provided unique challenges that needed to be addressed prior to any analysis being completed. The computing power necessary to wrangle a dataset with tens-of-millions of observations provided additional challenges. From a schematic standpoint, ZTRAX data is quite organized. All required information is housed in one of two formats, thus requiring a final compiling process. First, identifier columns are housed within two separate layout stylesheets in Microsoft Excel format (*ZTrans* for real estate transactions and *ZAsmt* for real estate assessment data). To properly retrieve the associated data from the stylesheets, the *readxl* package is used:

```
layoutZAsmt <- read_excel(file.path(dir, 'layout.xlsx'), sheet = 1)
layoutZTrans <- read_excel(file.path(dir, 'layout.xlsx'),
                           sheet = 2,
                           col_types = c("text", "text", "numeric", "text", "text"))
```

Afterwards, to retrieve the actual data that coincides with the column names, it is necessary to first pull the unique column identifiers from the layout stylesheets, pivot them from long to wide format, and then read in the data from the associated text format files:

```
col_namesValue.new <- layoutZAsmt[layoutZAsmt$TableName == 'utValue', 'FieldName']

col_namesValue.new <- col_namesValue.new %>%
  pivot_wider(names_from = FieldName, values_from = FieldName)

so.fi.data <- read.table(file.path(dir, "ZAsmt/Value.txt"),
                         sep = '|',
                         header = FALSE,
                         stringsAsFactors = FALSE,
                         skipNul = TRUE,
                         comment.char="",
                         quote = "")
```

Unfortunately, the process of reading in the actual data proved to be extremely time and resource intensive. Because of this, the process of data compilation was moved to the Amazon Cloud to make use of the Elastic Computing system. Specifically, a RStudio Server Amazon Machine Image was virtually booted onto an Amazon virtual server with a 64-core CPU and 488GB of RAM. Even with such computing power – far beyond any commercially available physical system – the process of compiling the data from the text files into a date frame within the virtual, cloud-based environment was difficult, taking over two hours to compile and then another two hours to complete the required cleaning and preparation process.

The cleaning process, in short, entailed removing any transaction with incomplete data. As well, only those transactions with a sales price greater than $1,000 were retained to avoid family-based transactions where the house was sold for nominal amounts, thus creating extreme outliers in the data. As well, only those residences within a 20-mile radius were also retained to limit the scope of the study. As previous studies suggest that real estate value outside of that radius experienced drastically decreasing impact residuals. Finally, the *geosphere* package was used to calculate each houses' total distance, in miles, from SoFi Stadium. To do so, the latitude and longitude of each house was compared against the latitude and longitude of SoFi Stadium and, using Vincenty's ellipsoid formula, the distance was found:

```
sofi.cleaned <- sofi.cleaned %>%
  mutate(sofilat = 33.95356,
         sofilog = -118.33859)
meter2mile <- 0.000621371
sofi.cleaned[, distance := meter2mile * geosphere::distVincentyEllipsoid(
  cbind(PropertyAddressLongitude, PropertyAddressLatitude),
  cbind(sofilog, sofilat)) ]
sofi.cleaned
```

To explore the impact of SoFi Stadium on sales prices based on proximity to the location, it was necessary to build several different treatment groups into the data. To do so, I partitioned the homes into different groups based upon their relative distance from the stadium:

```
sofi.cleaned <- sofi.cleaned %>%
  mutate(distance_ord = factor(
    case_when(
      distance <= 5 ~ "Short",
      distance >= 5.0001 & distance <= 10  ~ "Moderate",
      distance >= 10.0001 & distance <= 15 ~ "Long",
      distance >= 15.0001 & distance <= 20 ~ "Very Long")))
```

Categorizing the houses in such a fashion, in effect, creates a series of concentric circles with SoFi Stadium serving as the focal point. All the residences fall into one of the pre-determined groups – under five miles, between six and ten miles, between 11 and 15 miles, and between 15 and 20 miles – without overlap. After the coding of the concentric circles, the number of residences is as follows: short (n = 11,000), moderate (n = 26,585), long (n = 19,426), and very long (n = 41,773). As well, a variable needed to be created to indicate whether the sale of the property took place prior to 2016 or after 2016, as the land to build SoFi Stadium was purchased in that year:

```
sofi.cleaned$post16 = as.numeric(sofi.cleaned$year >= 2016)
```

In this research, I use a difference-in-differences approach to compare the pre- vs. post-announcement of the construction of SoFi Stadium to explore the impact of home value assessments for those residences near the construction site based upon the concentric circles with SoFi Stadium residing in the middle. As well, the difference-in-differences framework used accounts for unique property characteristics, including the number of bedrooms, the total square footage, the age of the dwelling, and total calculated bathrooms. A classical difference-in-differences model is used. The standard interaction model is as follows:

$$price = B_0 + \delta_0 post16 + B_1 ordiance + \delta_1 (ordiance\ x\ post16) + \varepsilon$$

However, given that the regression intercept is the prediction when all other coefficients are zero – meaning, zero years old, zero bedrooms, zero bathrooms, and zero square feet – it is necessary to means center these coefficient variables, as it is understood that houses indeed have age, bedrooms, bathrooms, and square footage. Doing so is common practice when working with linear regression models using real estate data (Dong & Hansz, 2016; Shin, Saginor, & Van Zandt, 2011). Once the linear model is created, the mean centering can be conducted by passing a list of vectors with the variable names to be centered:

```
model <- lm(SalesPrice ~ distance_ord * post16 +
          age + TotalBedrooms + TotalCalculatedBath + SqFt, data = sofi.cleaned)

v.center <- c("TotalBedrooms", "SqFt", "age", "TotalCalculatedBath")

meanCenter(model, centerOnlyInteractors = TRUE, centerDV = FALSE,
        standardize = FALSE, terms = v.center)
```

After centering, the mean total bedrooms is 3.1813, the mean square footage is 1,774.705, the mean age of the houses is 44 years old, and the mean total bathrooms is 2.2011.

The construction of the DID regression for rental units follow suit with housing prices. However, to determine rent-to-income burden, I retrieved estimated monthly rent and income for census tracts within the 40-mile concentric circles. Afterwards, the results are calculated by grouping the data by the distance variable and year and then dividing the total number of census tracts over the widely accepted 30-percent income-to-rent ratio by the total number of census tracts:

```
rental.did.income.chart <- rental.did.income.chart %>%
  mutate(ratio = rentE / (median_incomeE / 12))

rental.did.income.chart <- data.frame(lapply(rental.did.income.chart$distance_ord, as.character),
                                      stringsAsFactors = FALSE)

final.ratio.numbers <- ratio.numbers %>%
  group_by(distance_ord, year) %>%
  summarize(over.ratio = sum(ratio >= .30))

final.ratio.numbers <- final.ratio.numbers %>%
  mutate(total.plots = as.numeric(
    case_when(
```

```
    distance_ord =="Short" ~ "182",
    distance_ord == "Moderate" ~ "995",
    distance_ord == "Long" ~ "2412",
    distance_ord == "Very Long" ~ "2150")))

final.ratio.numbers <- final.ratio.numbers %>%
  mutate(percent = over.ratio / total.plots)
```

The construction of the multi-group segregation index in this research is completed using the *segregation* package. While there are numerous approaches to measure the segregation and diversity of a locale, I employ the package to quickly calculate Theil's Entropy Index, as showcased by Mora and Ruiz-Castillo (2011) and Elbers (2021), in order to allow for the measurement of segregation and diversity between more than two groups at a time. When constructing the Index, the formula below is used, wherein the dataset is *T:*

$$M(T) = \sum_{u=1}^{U} \sum_{g=1}^{G} P_{ug} \log \frac{p_{ug}}{p_u p_g}$$

To start the process, I first gather the relevant information from the American Community Survey census information via the use of the *tidycensus* package for both 2012 and 2019. As well, I collect all cities in California with a population greater than or equal to 100,000. After both processes are completed, a simple inner spatial join is completed to compile the data into a singular data frame:

```
los.angeles.indices <- get_acs(
  geography = "tract",
  variables = c(
    white = "B03002_003",
    black = "B03002_004",
    hispanic = "B03002_012"
  ),
  state = "CA",
  county = "Los Angeles",
  geometry = TRUE,
  year = 2012
)

california.cities <- get_acs(
  geography = "place",
  state = "CA",
  variables = "B01001_001",
  geometry = TRUE,
  year = 2012,
  survey = "acs1"
) %>%
  filter(estimate >= 100000) %>%
  transmute(urban_name = str_remove(NAME,
                                    fixed(" city, California")))

ca_city_data <- los.angeles.indices %>%
  st_join(california.cities, left = FALSE) %>%
  select(-NAME) %>%
  st_drop_geometry()
```

At this point, the multi-group segregation index is prepared to be explored. The process of preparing the data for exploration via a diversity gradient is a simple matter of taking the already created "ca_city_data" dataframe and prepping it using the "entropy" function within the *segregation* package:

```
inglewood_entropy <- ca_city_data %>%
  filter(urban_name == "Inglewood") %>%
  split(~GEOID) %>%
  map_dbl(~{
    entropy(
      data = .x,
      group = "variable",
      weight = "estimate",
      base = 4
    )
  }) %>%
  as_tibble(rownames = "GEOID") %>%
  rename(entropy = value)

inglewood_entropy_geo <- tracts("CA", cb = TRUE, year = 2012) %>%
  inner_join(inglewood_entropy, by = "GEOID")
```

Lastly, to examine the diversity gradient via driving time, in minutes, from SoFi Stadium, I use two different geospatial packages – *tigris* and *MapBoxAPI* – to retrieve the geometry of Inglewood's census tracts as well as calculating the distance to SoFi Stadium using feature centroids:

```
inglewood_entropy_geo <- tracts("CA", cb = TRUE, year = 2019) %>%
  inner_join(inglewood_entropy, by = "GEOID")

sofi.distance <- mb_geocode("SoFi Stadium, Inglewood CA")

minutes_to_sofi <- mb_matrix(inglewood_entropy_geo, sofi.distance)

inglewood_entropy_geo$minutes <- as.numeric(minutes_to_sofi)
```

Again, using the *segregation* package, the following equation is performed to get the end calculations:

$$E = \sum_{r=1}^{n} Q_r \ln \frac{1}{Qr}$$

With all the data preparation, cleaning, and manipulation completed, I can run all the coding through RStudio and turn to examining the results.

RESULTS

Table 1 presents the results of the difference-in-differences regression model using the year 2016. The *Intercept* and initial *Post 16* are based on the 'Long' distance variable, as – when conducting a regression model in the R programming language – the output uses alphabetical order to pick a reference point. In this case, the regression indicates houses in the 'Long' distance, with average age, number of bedrooms, bathrooms, and square footage, sold at a mean of $378,857.91. Houses in the 'Short' distance sold for, on average, $65,002.37 less, while 'Moderate' houses sold for $5,563.49 more, while 'Very Long' houses had an estimated $26,231.92 increase in sales prices average compared to the regression's reference point. In the post-2016 years, the difference-in-differences model highlights a $195,313.34 increase in mean sales prices over the intercept. Houses in the 'Short' circle averaged a $33,893.27 increase, houses in the 'Moderate' circle averaged a $9,959.77 decrease in sales price, while houses in the 'Very Long' circle averaged a $54,782.33 increase.

	Estimate	**t-value**
Intercept	$378,857.91*** *(3.75)*	119.84

Short	-$65,002.37 *(3.57)*	-18.19
Moderate	$5,563.49 *** *(3.01)*	-1.84
Long	$378,857.91*** *(3.75)*	119.84
Very Long	$26,231.92 *** *(2.92)*	8.98
Post 16	$195,313.34 *** *(7.12)*	27.39
Short ***Post16***	$33,893.27** *(1.12)*	3.00
Moderate ***Post 16***	-$9,959.77 *(1.029)*	-0.96
Long ***Post 16***	$195,313.34 *(7.12)*	27.39
Very Long ***Post 16***	$54,782.33 *** *(8.41)*	6.51

Table 1*: Note: *** and ** refer to statistical significance at the 99% and 95%, respectively. Standard errors are in parentheses. + indicates that coefficient is means centered. R-Squared value is 0.24.*

Table 2 presents these numbers in their entirety. The *Intercept*, with the additional post-2016 averages, sold for, on average, $574,171.25. The *Adjusted Treatment* is based off that reference point. For instance, the 'Short' post-2016 average of $33,893.27 was added to the post-2016 *Intercept* average for a 'Short' post-2016 total average of $608,064.53. After calculating the *Adjusted Control* and *Adjusted Treatment*, the *Percent Difference* presents the total growth between the two. Based on the difference-in-differences approach, those houses in closest proximity – within a five miles radius – had the largest increase, by far, between *Adjusted Control* and *Adjusted Treatment*.

Distance in Miles	Adjusted Control	Adjusted Treatment	Percent Difference
< 5	$313,855.54	$608,064.53	63.83%
5.1 – 10	$384,421.40	$564,211.48	37.90%
10.1 – 15	$378,857.90	$574,171.25	40.98%
15.1 – 20	$405,089.83	$628,953.58	43.30%

Table 2: *The percent difference in housing value between the adjusted control (pre-2016) and after the adjusted treatment (post-2016).*

Table 3 presents the information based on rate of growth between 1993 and 2016 and then after the announcement of

SoFi Stadium was made in 2016 through 2021. A standard rate of growth equation was used:

PercentChange = 100 x (2016Mean – 1993Mean) / 1993Mean
GrowthRate = PercentChange / NumberOfYears

As seen in the table, after the announcement of SoFi Stadium, the rate of growth in average home sale prices for those in the 'Short' variable was 4.72%, more than a doubled rate of growth compared to houses in all the other concentric distances.

Distance	1993 Mean	2016 Mean	ROG	2016 Mean	2021 Mean	ROG
Short	$202,584	$481,744	5.99%	$481,744	$595,587	4.72%
Moderate	$278,358	$537,099	4.04%	$537,099.	$600,008	2.34%
Long	$281,786	$561,580	4.31%	$561,580	$565,556	0.14%
Very Long	$254,076	$617,791	6.22%	$617,791	$704,518	2.80%

Table 3: *The rate of growth (ROG) for housing values, based on concentric distance, before and after construction of SoFi Stadium in Inglewood, California.*

Table 4 presents the results of the difference-in-differences regression model for the cost of rent. The model indicates houses in the 'Long' distance – serving as the *Intercept* – rented for a monthly mean of $1,261.08. Housing in the 'Short' distance rented for, on average, $130.72 less, while 'Moderate' housing rented for $61.79 less, and 'Very Long' housing had an estimated $97.52 increase in rent average compared to the regression's reference point. In the post-2016 years, the difference-in-differences model highlights a $103.47 increase in mean rent over the intercept. Houses in the 'Short' circle averaged a $36.41 increase, housing in the 'Moderate' circle averaged a $2.30 decrease in sales price, while housing in the 'Very Long' circle averaged a $12.56 increase.

	Estimate	t-value
Intercept	$1,261.08*** *(23.74)*	53.107
Short	-$130.72 *(122.57)*	-1.067
Moderate	$-61.79 *(48.05)*	-1.286
Long	$1,261.08 *(23.74)*	53.107
Very Long	$97.52 ** *(31.56)*	3.090
Post 16	$103.47*** *(26.31)*	3.933
Short ***Post16***	$36.41 *(1.12)*	0.266
Moderate ***Post 16***	-$2.30 *(53.20)*	-0.043
Long	$103.47***	0.266

Post 16	*(1.12)*	
Very Long	$12.56	
Post 16	*(34.96)*	0.359

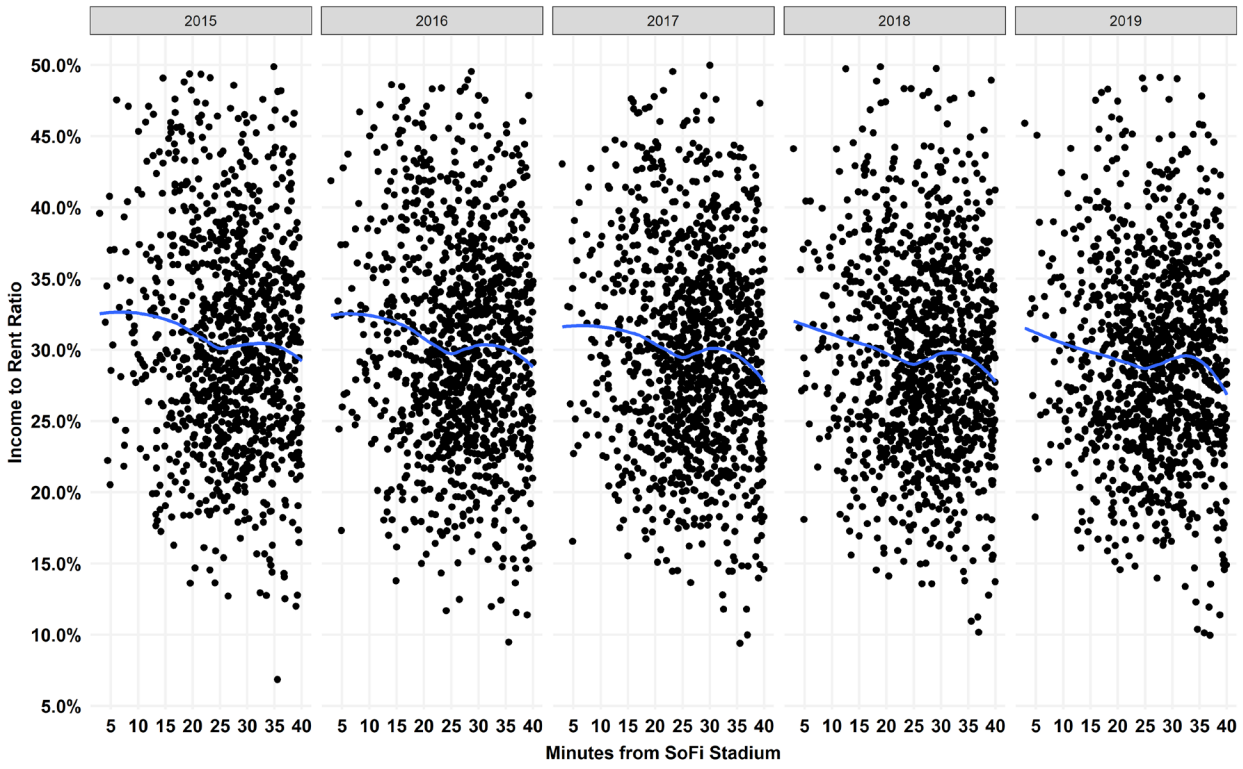
Table 4: *Note: *** and ** refer to statistical significance at the 99% and 95%, respectively. Standard errors are in parentheses. R-Squared value is 0.021.*

Table 5 presents these numbers in their entirety. The *Intercept*, with the additional post-2016 averages, rented for, on average, $1,364.55. After calculating the *Adjusted Control* and *Adjusted Treatment*, the *Percent Difference* presents the total growth between the two. Based on the difference-in-differences approach, rental units in closest proximity – within a five miles radius – had the largest increase, by far, between *Adjusted Control* and *Adjusted Treatment*.

Distance in Miles	Adjusted Control	Adjusted Treatment	Percent Difference
< 10	$1,130.36	$1,400.96	21.38%
10.1 – 20	$1,199.29	$1,362.25	12.72%
20.1 – 30	$1,261.08	$1,364.55	7.88%
30.1 – 40	$1,358.52	$1,377.11	1.35%

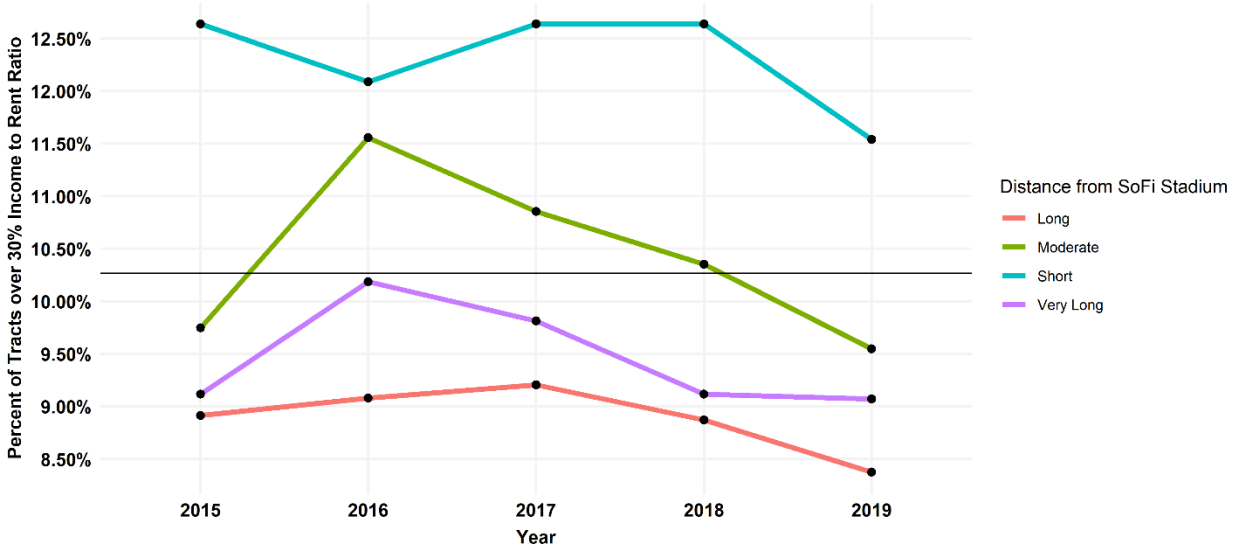
Table 5: *The percent difference in the cost of rent between the adjusted control (pre-2016) and after the adjusted treatment (post-2016).*

Examining the data through the lens of income-to-rent ratio provides further insight into the financial impact those living closest to SoFi Stadium are feeling compared to those living at further distances. Graph 1, below, highlights the income-to-rent ratio for all census tracts that comprise the city of Inglewood faceted by year, 2015 through 2019. The most common metric to determine the amount of burden placed on renters is the rent-to-income ratio – or dividing rent by income. The U.S. Department of Housing and Urban Development (HUD) "defines households that spend more than 30-percent of their income on housing" as rent burdened (Schuetz, 2017). Graph 1 visualizes the amount of rent burdened census tracts based on distance, in minutes, from SoFi Stadium. The data indicates that those census tracts closest to SoFi Stadium have the highest burden percentage. The contrast between the amount of rent burden and distance become quite amplified in the years after the construction of SoFi Stadium, as the graph shows a much sharper gradient in 2018 and 2019 compared to earlier years.



Graph 1: The income-to-rent ratio for us census track organized by year and distance from SoFi Stadium (in minutes).

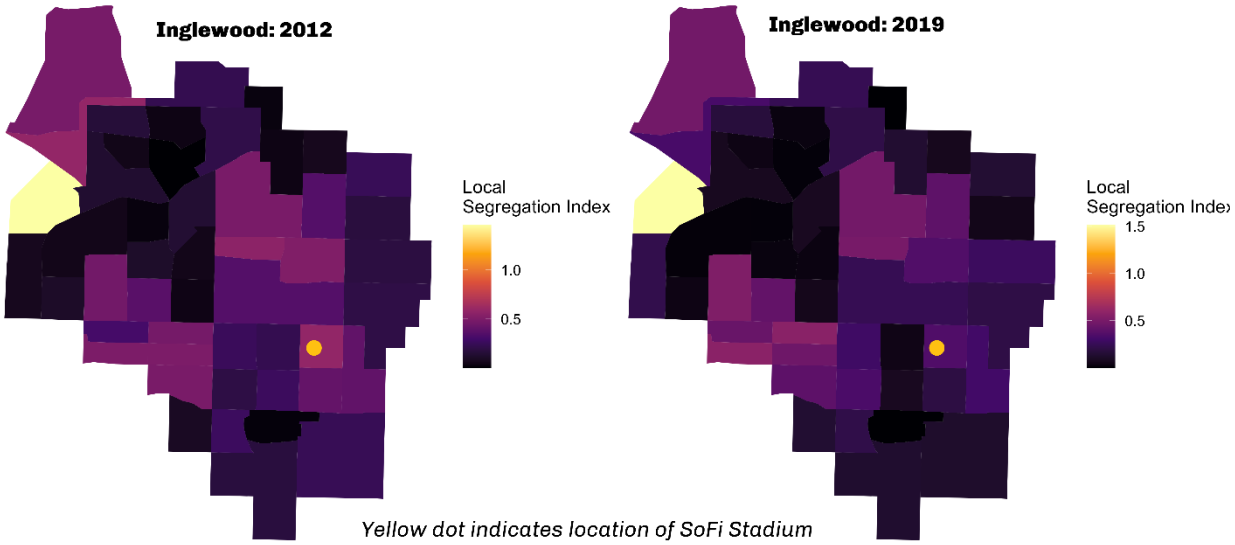
A more detailed look at the data is displayed in Graph 2. By taking the total number of tracts in each concentric distance from the DID regression and then dividing that by the total number of those over the 30-percent income-to-rent ratio, I can determine the percent of tracts facing rent burden based on distance from SoFi Stadium. The results are in line with the information displayed in Graph 1. Specifically, those tracts closest to SoFi Stadium regularly maintain not only more rent burden than any other distance but have also maintained a percentage well above the five-year average (as displayed by the horizontal black line).



Graph 2: The percent of tracts over 30-percent income-to-rent ratio based on distance to SoFi Stadium by year.

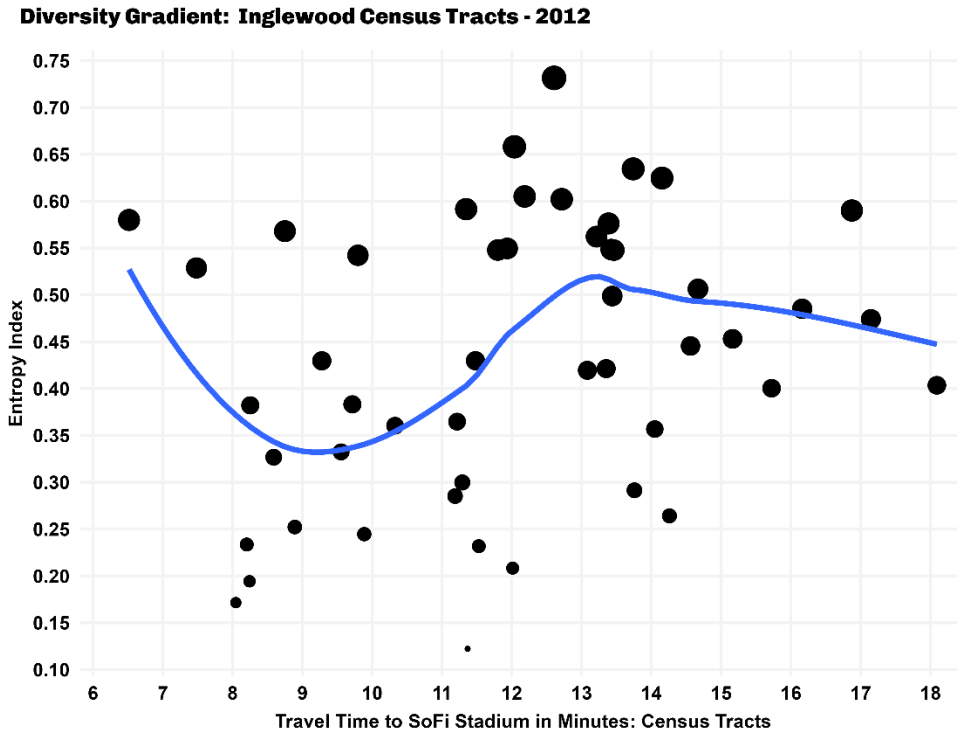
The financial implications on the cost of housing and rent caused by the construction of SoFi Stadium are clear using the above approach. However, it is also important to consider who is being most impacted by these increases in the cost of obtaining affordable housing. To do so, I turn to the creation of a segregation index for Inglewood census tract,

as seen in Graph 3. As indicated, the yellow dot in each shows the approximate GPS coordinate location of SoFi Stadium. Using the method first proposed by Massey and Denton (1989), the associated legend is interpreted so that an index of 0.0 indicates absolute and complete integration.. A well, the index considers segregation at its smallest when the majority and minority populations are evenly distributed. The value indicates the percentage of the minority group that needs to relocate to be as distributed as the majority group. As evident in Graph 3, the immediate area surrounding SoFi Stadium was heavily segregated in 2012. However, by 2019, the immediate area is clearly less segregated, highlighting the likelihood of gentrification taking place.



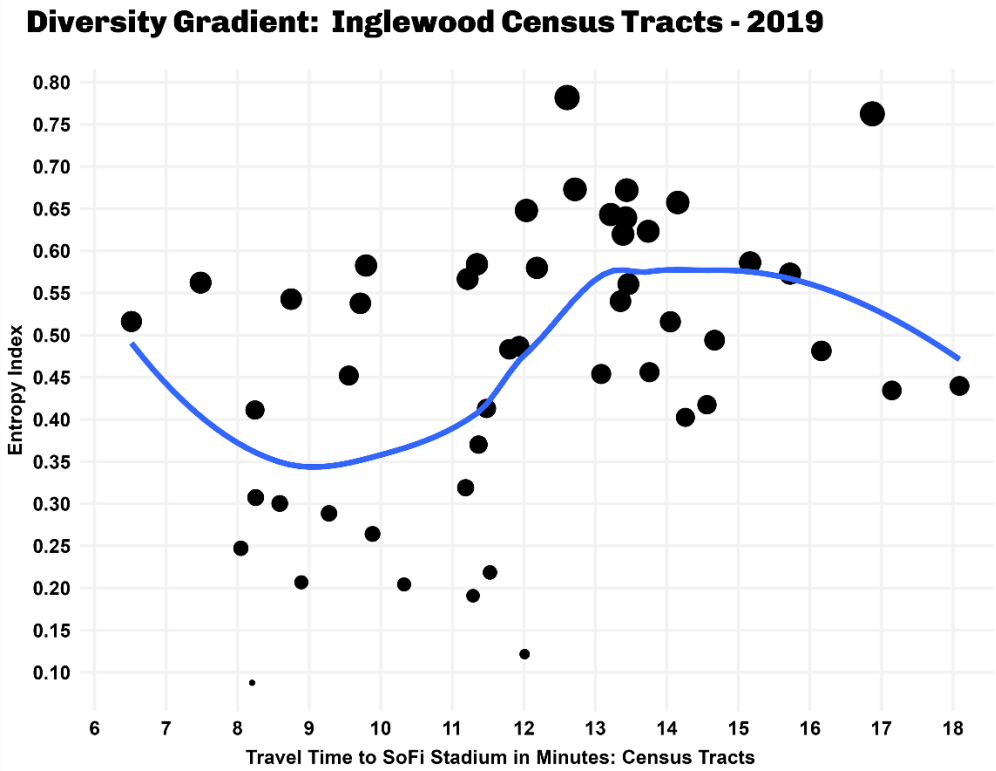
Graph 3: The segregation index of census tracts surrounding SoFi Stadium in 2012 (left) and 2019 (right).

Moreover, creating a micro-visualization of the segregation index via entropy indices allows for a more refined understanding of what is occurring in the area directly surrounding SoFi Stadium. In 2012, the diversity gradient indicates that overall neighborhood diversity continued to decrease with increased driving time from SoFi Stadium's location. It is not until roughly nine minutes into the drive does neighborhood diversity begin to increase, indicating – based on the structure of the data I created – that there is a gradual inclusion of white citizens until the peak diversity mix at approximately 13-minutes away from SoFi Stadium.



Graph 4: The entropy index for census tracts based on distance from SoFi Stadium (in minutes) for 2012.

For a community that is attempting to remain a Black enclave, the 2019 diversity gradient – compared to the 2012 version – showcases a troubling trend. The initial dip in 2019 is unquestionably shallower than in 2012 and pre-construction of SoFi Stadium and the partnering entertainment complex. This shallower dip is a clear indication that higher amounts of entropy is encroaching closer to the confines of SoFi Stadium, thus likely perpetuating a worrisome number of issues for the now historically Black population, namely the likelihood that more affluent, non-Black residents are moving in to take advantage of the increasingly popular and expensive real estate market.



Graph 5: The entropy index for census tracts based on distance from SoFi Stadium (in minutes) for 2012.

DISCUSSION & CONCLUSION

The findings in this research indicate several concerning trends for the minority population in Inglewood, especially those living in closest proximity to the new SoFi Stadium entertainment complex. First, using the difference-in-differences regression model, I found that home values for locations closest to SoFi Stadium, meaning within the five-mile radius, increased at a higher percentage and growth rate post-groundbreaking of the facility – nearly double the rate – relative to houses in further concentric circles. Moreover, the findings for rental units are largely the same. Rental units in census tracts closest to SoFi Stadium, as measured by distance in minutes, maintained higher income-to-rent ratios than census tracts at further distances. At no point in the five years examined did the closest census tracts go below a 30-percent ratio, signifying a significant rent burden for those living closest to the stadium. As well, no less than 11.5-percent of the census tracts in the "Short" concentric circle relative to SoFi Stadium are considered dangerously rent-burdened. My findings therefore converge from Coates and Matheson (2011), Dehring, Depken, and Ward (2007), and Kiel, Matheson, and Sullivan (2010) who all found little relationship between professional sport stadiums and rent and/or house value/sale prices. Specifically, Table 1 shows an increase in the percent difference between the *Adjusted Control* and *Adjusted Treatment* sale prices of those houses in the closest concentric circle. As well, Table 2 highlighted the largest Rate of Growth from post-2016 construction to 2021 for those houses within five miles of SoFi Stadium. Moreover, using both a segregation and entropy index, Inglewood is currently going through a race-based gentrification process, thus threatening the way of life for most of the Black citizens calling California's "last black enclave" home. The construction of the Barclays Center at the intersection of Flatbrush and Atlantic Avenues, as another example, was deemed by housing fairness activists, community leaders, and others as prime illustration of the "triumph of global capital over local communities and culture" (Boston, 2020).

Indeed, Hwang and Ding (2020) found that the "negative effects of gentrification are felt disproportionately by minority communities, whose residents have fewer options of neighborhoods they can move to compared to their white counterparts." Both the segregation index and the diversity gradient emphasize that Inglewood is, undoubtedly, becoming increasingly white. However, with the construction of SoFi Stadium and the plethora of accessory complexes associated with it, this is far from a unique phenomenon. As the core of Inglewood redevelops, it is likely

that the city will follow the trend of others nationwide, wherein "white home buyers" arrive in the core with "incomes that are on average twice as high as that of their existing neighbors, and two-thirds higher than existing homeowners" (Badger, Bui, & Gebeloff, 2019). Graph 2 clearly shows this residual impact of gentrification taking place. Shortly after the construction on SoFi Stadium started, a noticeable downward trend appeared in all concentric distances in the percentage of census tracts above the 30-percent threshold for income-to-rent burden. Combined with the shallower curve in the diversity gradient, this is telltale of gentrification as those homebuyers arrive with higher incomes.

The results of this study unquestionably affirm Los Angeles Rams' owner Stan Kroenke's belief that the construction of the new facility would ultimately boost the property values in the surrounding area relative to home values at further distances. The impacts were felt just after ground was broken in 2016. The stadium did not hold its first home football game until September 2020, meaning the gentrification process is likely still in its infancy stage and will continue to snowball as more and more of the associated entertainment complex is completed in the areas surrounding SoFi Stadium. The findings of this study provide the necessary arguments for substantial planning and policy attention for Inglewood and its Black and/or minority citizens. Otherwise, the aforementioned concerns outlined by Murdie and Teixeira (2011) and Newman and Wyly (2006) – damage to the local education system, the depletion of long-term viability and supply of low-cost housing, and a widening gap in class polarization – are likely to become a stark reality in Inglewood as the displacement of Blacks from America's last "Black enclave" continues unabated in the name of football and the Los Angeles Rams.

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PROPERTY LINE DISPUTES: ADVERSE POSSESSION VERSUS CONSENTABLE BOUNDARY LINE

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ABSTRACT

Commonly understood methods of acquiring ownership of real estate are by contract, inheritance or devise and gift.[1] Additional methods and perhaps not so commonly understood, are by adverse possession and consentable boundary line. These latter two methods will be herein defined, compared, and contrasted. The emergence of consentable boundary lines as a more common legal remedy for acquiring ownership of real property, will also be illustrated, and explored in light of recent Pennsylvania Appellate Court decisions.

ADVERSE POSSESSION

Adverse Possession is a doctrine that is deeply rooted in our law. Simply put, it is the acquisition of another person's property for one's own use. Two tenets are the basis of this doctrine. First, one who has been in possession of real property for an extended period of time, maintaining it, improving it, and claiming it as his own, should be secure in its ownership. Second, the owner who fails to object to the possessor, who over an extended period of time, has maintained the property, improved it, and claimed it as his own, may not further claim the property as his own.[2]

The Doctrine Adverse Possession is embodied in the law, legislatively, under the statutes of limitations. The statutes bar legal actions to recover or establish the legal owner's title to real property upon the expiration of specified term of time. In Pennsylvania, the term of time is 21 years. Thus, the owner of real estate must commence within 21 years an action or proceeding for the possession of real property.[3] The time frame is 10 years under specific circumstances, later described.[4] So too, an adverse possession may obtain title by filing a quiet title complaint against the record holder. The complaint must provide for a 1 year right to cure, thus setting into motion a judicial resolution of the claim.

The Pennsylvania Supreme Court observed in 1855:
"In order to give title under the Statute of Limitations, the possession of the disseisor must not only be actual, but it must be visible, notorious, distinct, hostile, and continued for the period of 21 years: Hawk v. Senseman, 6 Ser. End R. 21: Adams v. Robinson, 6 Barr 271. This doctrine has been so constantly repeated by our courts, and so generally acted upon by the people, that it has become a rule of property that cannot be changed without a manifest disregard of the principle of stari decises, producing in its result an alarming violation of the right of property, and of disastrous disturbance to the quiet of the community.[5]

All of the above elements must exist, or the possessor will not acquire title from the owner of the disputed tract. Further, as the Doctrine of Adverse Possession is deemed an extraordinary remedy, the burden of proving the required elements is by credible, clear and definitive proof.[6]

Possession must first be actual. This must be some overt act that is inconsistent with the right of the real owner. The following acts have been held, by Pennsylvania Courts, to have established actual possession: constructing buildings, taking up residence, erecting a fence, cultivating crops, and clearing the land.[7] The payment or non-payment of taxes on the real property is not in and of itself determinative of possession.[8] Further all subsurface rights such as minerals would not be subject to claim of possession.[9]

The possession of the real estate must be continuous. This possession must be the interrupted for the entire statutory 21-year period.[10] There is an exception to the 21 year time frame. Effective June 19, 2019, Pennsylvania enacted legislation which provides for a 10-year time frame to obtain title to real property.[11] Specific circumstances apply, however. Those are: the property must be a half-acre or less, it must be an improved single-family dwelling and must be identified as a separate lot, recorded subdivision plan or recorded official map or plan of a municipality.[12] The possessor, however, need not be the same individual over the entire period of time, but may be in succession. This is termed "tacking of interests". In order for possession to be tacked, there must be privity between the successive occupants of the property. Privity refers to a succession of relationship to the same thing, whether created by deed or by acts or by operation of law. However, a deed does not itself create privity between the grantor and the grantee as

to the land not described in the deed but occupied by the grantor in connection therewith, although the grantee enters into possession of the land and uses it in connection with that conveyed. Rather, acceptance of the deed describing boundary lines confines the premises conveyed to the area within the boundaries, and such a deed does not convey inchoate rights acquired by incomplete adverse possession. Each possessor much have claimed title to the property in dispute and have purported to include it.[13]

The possession must be visible and notorious. The possessor must be open in his use of the real estate and demonstrate exclusion of the true owner.[14]

The possession must be distinct and exclusive. The possessor must do so alone, or with a co-tenant, not possess in common with others.[15] The possessor must assert acts as appropriate to true ownership.[16]

Lastly, the possession must be hostile. He must claim the property as his own and open to all, including the true owner.[17] Thus, possession by permission of the owner would not be hostile. Possession may still hostile, however, even though the possessor and the state is mistaken in the belief as to the ownership of land, provided all of other elements of adverse possession exist. The Court may, therefore, infer the element of hositility.[18] Further, hostility does not imply ill will, but rather holding the property against the interests of others.[19]

CONSTABLE BOUNDARY LINES

The Doctrine of Consentable Boundary Lines, while perhaps not as well-known as adverse possession, is nonetheless well rooted in our law.[20] "Where a line has been clearly established and the parties on each side take possession or surrender possession already held up to that line, it becomes binding, under the application of the Doctrine of Estoppel." [21] The Doctrine of Consentable Boundary Lines is a rule of repose for the purpose of quieting title and discouraging confusing and vexatious litigation. [22]

Consentable Lines is embodied in our law, statutorily, mandating actions and proceedings to be commenced within 21 for possession of real property.[23]

There are two requirements for the establishment of a binding consentable lines, thus entitling the possessor to acquire title to real property:
Each party must have claimed and occupied land on his side of the line as his own; and
Such occupation must have continued for the statutory period of 21 years.[24]

The case of Zeglin v. Gahagen provides an excellent history of the case law evolution of this doctrine.[25]

Under the Doctrine of Consentable Lines, there are two theories upon which a boundary may be established:
By dispute and compromise: and,
By recognition and acquiescence.[26]

Under the dispute and compromise theory, a consentsble lines is established by agreement between the owner and possessor.[27] Consentable line established by recognition and acquiescence occurs when the possessor possesses another's real property of which the owner is aware but fails to object.[28] As the Court in Zeglin noted, acquiescence in the context of disputed boundaries denotes past conduct on the part of the lawful owner consisting of failure on his part to assert his paramount rights or interests against the hostile claims of the adverse user.[29]

Therefore, where visible boundaries have existed for the period set forth in the Statute of Limitations, 21 years, title will vest in the possessor, either by compromise or acquiescence in the disputed property provided here is clear and convincing evidence.[30]

ADVERSE POSSESSION AND CONSENTABLE LINES CONTRASTED

The Courts have noted that the doctrinal roots of Consentable Lines are grounded in the theory of adverse possession.[31] However, the doctrine of Consentable Lines is distinguishable from adverse possession in several ways. Firstly, a consentable line may be established based upon the mistake as to the location of the property lines. Adverse

possession, however, may ordinarily not be established on the basis of a mistake. While possession of the property up to a line may constitute adverse possession of the true owner's real property, the intent of the possessor may not necessarily be hostile. [32] Put another way, adverse possession requires the intent of the possessor to hold the property against the record holder; that the possession be hostile. Acquiescence, on the other hand, denotes passive conduct on the part of the lawful owner consisting of failure on his part to assert his paramount rights or interest against the claim of the possessor.[33] Under the Doctrine of Adverse Possession, it may be material whether possession was due to ignorance or mistake. With consentable lines, it is not. [34]

The other distinction between the two doctrines concerns the tacking of claims by successors. Privity of estate is prerequisite to tacking under adverse possession. "The only method by which an adverse possessor may convey a title of certified adverse possession is to describe in the instrument of conveyance by means minimally acceptable for conveyance of realty that which is intended to be conveyed.[35] With respect to consentable line, however, tacking may be established by successive owners by privity owners by privity of possession.[36] As the Court in Zeglin noted, " The circumstances of unified use, and the physical transfer of possession of the disputed tract, and continued adverse use thereof and of the conveyed tract as incorporated and unified whole, show the parties intended to transfer not only the title to conveyed tract, but also the possession to the disputed area whose use was integrated with the conveyed tract, notwithstanding the omission from the deed of any mention of the disputed area."[37]

THE EMERGENCE AND ILLUSTRATION OF THE CONSENTABLE LINES DOCTRINE

The Supreme Court case of Zeglin, firmly established the Doctrine of Consentable Lines as separate and distinct remedy in acquiring title to real property as opposed to the Doctrine of Adverse Possession.

The following Superior Court case illustrated the use and the extensions of the Doctrine of Consentable Lines. In Wells v. Schaffer,[38] the facts are as follow: A property dispute existed between two adjoining land owners in Clearfield County, Pennsylvania. Each party claimed ownership of approximately 2.2 acres of land located between respective properties. The area in question is in a rural part of the county with s structured development, camp home on a foundation, campground area, septic systems and water lines and a brick lined pond all which were installed and maintained by Wells and his family since 1967. The surrounding landowners, including Schaffer, had never actually occupied any areas directly adjacent to the subject developed areas of Wells', with large wooded areas and significant distances between the subject property boundary and neighboring owner's structure. Schaffer had become the owner of approximately 122 acres located adjacent to the subject area by purchasing a neighboring property. Wells is the owner of the 1.5 acres that is located to the north of the property owned by Schaffer. Wells had received the 1.5 acres of property along with the additional 2.2 acres of disputed property from his parents. Prior thereto, the Wells family had a camp home and other structures on the property that they occupied, maintained, and continuously used from 1966 through the present. Mr. Schaffer and his predecessor had been the record title holder of the subject area, although Wells and his predecessor had actually occupied and maintained the area in question. Wells commenced use of the disputed property by first asking permission from an individual he thought, mistakenly, owned the property. Wells cleared the trees and brush, built a pond, lined with bricks, and continued to maintain the disputed area down to Laurel Run Creek. There was no fence erected.

The Trial Court found in favor of Wells. On appeal, the Superior Court affirmed with dissenting opinion. The Court held the Wells' visible act of possession and construction of permanent structures on the land negated any inference contrary to them claiming ownership of the disputed property. That is, the issue of Wells obtaining permission, either from the true owner or one he believed to be the true owner, was immaterial given his visible acts asserting ownership. Further, the Court found that there was no requirement that the parties expressly agree to a boundary line. Provided that the true owner never objected to Wells' presence on the disputed land until after the statutory period of 21 years, acquisition by consentable lines existed.

Lastly, while there was no fence erected, nor any other markers established, such as bushes or utility poles, consentable line, nonetheless, existed between the two properties. The boundary line was marked by a creek and the edge if woods, to which Wells cleared trees and brush, mowed and maintained.

The dissent objected to the majority's application of the Doctrine of Consentable Lines. Specifically, the dissent noted that in this case, there was no clearly marked boundary line. There was no fence, row of trees, row of bushes, or utility

pole, all which had existed in precedential cases. The dissent opined that applying the Doctrine of Consentable Lines in this instance, where there is no clearly delineated line or border, is improper. Moreover, the dissent observed that this case was one of adverse possession improperly converted into a boundary by acquiescence case due to the inability of Well's to tact their possession of the land onto their predecessor in title's possession. The dissent, therefore, believes the majority has improperly extended the use of the Doctrine of Consentable Lines.

RECENT APPELLATE CASES

In the cases Rach vs. Williams.[39]The Pennsylvania Superior Court, in a non-precedential decision, ruled that for the Doctrine of Consentable Lines to apply, the line in dispute must be clearly ascertainable. As a three (3) fast wide hedge was asserted as the boundary line, the court ruled that there was not clearly ascertainable, precise line.

Where a precise line is asserted as existing the litigating parties, the boundary lines as stated in the recorded deed are irrelevant. Steein, M. v. Grabowsfe, R. [40] The Superior Court of Pennsylvania, in this 2019 case, found that a consentible boundary line existed and entered an order verifying little accordingly, irrespective of the deed recitals.

Lastly, in the case of Medival v Smith,[41] the Pennsylvania Superior Court affirmed a judgment entered in favor of a claimant of a tract of land based upon the doctrine of consentable line.

As in the Wells case, supra, the tract of disputed property was substantial, just over eight (8) acres.
The line established was by a four (4) wire fence, which had existed for over several decades. The parties were each aware of the fence, and each had treated the land on their side of the fence as their own.

The Court found that a consentable boundary line existed by recognition and acquiescence as the requisites for such existed.

SUMMARY

There is no question but that acquiring title to another's real property by either adverse possession or consentable lines is contentious. The existence and emergence of the Constable Lines Doctrine as enunciated by the Supreme Court in Zeglin, and then subsequently applied by the Superior Court is case of Wells, as well as other recent cases, indicates its expanded use as a legal remedy in property boundary disputes.

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A PROFIT-BASED VIEW OF ECONOMIC GRANULARITY IN THE PERSPECTIVE OF MARKET COMPETITION

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ABSTRACT

Different from the extant literature, this paper looks at Gabaix's (2011) granular hypothesis from an analytical angle in the perspective of profits and market competition. By establishing the profit picture for the initial firms of an emerging market and that for the incumbent firms of a maturing market, we show that consumers' forever evolving preference and tastes help intensify market competition and encourage new firms to enter an established oligopoly market. Based on this profit-based logic of reasoning, among other results we establish precise conditions under which Gabaix's granular hypothesis is either surely true or definitely not true, followed by relevant empirical confirmations. At the end, several important open questions are posed for future research.

INTRODUCTION

No matter whether it is in natural or social science, a version of inductive arguments has been employed to derive overarching conclusions. For example, many definite theorems in mathematics are shown by using a version of the known mathematical induction, where "for every" and "for all" are used interchangeably without any discrimination (Forrest, 2013); in macroeconomics, a standard reasoning, which helps to materialize leaps from individual components (such as firm-level phenomena) to an organic whole (such as the economy), generally leads to practically discarding the possibility for idiosyncratic shocks at micro-level of firms to cause aggregate fluctuations at the macro-level of the economy (Lucas, 1977). Because of this backdrop, when Gabaix (2011) proposes his now famous granular hypothesis, the work generated a strong wave of academic attention. Gabaix finds empirically that idiosyncratic firm-level shocks can indeed explain an import part of aggregate economic movements and provide a micro-foundation for aggregate shocks; it is especially true for the case of the United States, where the idiosyncratic movements of the largest 100 firms seem to explain around one-third of variations in output growth. Following Gabaix's pivotal work, many scholars look at the granular nature of economies from different angles. For example, by using econometric approaches, Wagner (2012), Hottman et al. (2016) and Atalay (2017) confirm the phenomenon of economic granularity. By employing classes of games, Acemoglu et al. (2015) examine how network interactions can function as a mechanism for propagation and amplification of microeconomic shocks. By applying structural factor analysis, Foerster et al. (2011) discover that nearly all variabilities in industrial productivity are associated with common factors. By utilizing the concepts of either business or production networks, Acemoglu et al. (2012), Carvalho (2014), Barrot and Sauvagnat (2016) and Boehm et al. (2019) find that sectoral idiosyncratic shocks lead to sizable aggregate volatility only when there exists significant asymmetry in the roles sectors play as suppliers to others. By using methods of decomposition, Giovanni et al. (2014) confirm that firm-specific component contributes substantially to aggregate sales volatility. By employing stochastic simulations, Roson and Sartori (2016) analyze how sectoral shocks affect changes in the GDP.

To enrich the literature along this line of attention, this work focuses on the *dominance* in the economy of those "incompressible" firms, the key component and an obviously unfilled gap in the extant research. To do this, we investigate the problem of when Gabaix's granular hypothesis holds true in general and when it fails definitely in the perspective of profits, trades and competition. Because of the approach used in this paper, we are able to establish a series of conclusions that hold true in general without subject to any constraints of data analysis.

The rest of this paper is organized as follows. Section 2 provides a literature review while showing where and how this work makes it contribution. Section 3 presents a simplified version of how the market whose appearance accompanies the emergence of an industry evolves from the angle of profits. It consists of two subsections with the first one looking at the emergence and growth of the market and the second on how competition plays out as the market matures. Section 4 establishes conditions under which Gabaix's (2011) granular hypothesis either holds true in general or does not hold true at all. In Section 5, a set of newly available data is employed to confirm the conditions

established in Section 4. This paper concludes in Section 6, where some unsettled problems, which are both practically and theoretically important, are given for future research.

LITERATURE REVIEW

In our attempt to investigate Gabaix's granular hypothesis, this paper touches on three different while related literatures: emergence and development of industries, market competitions and granularity of economies.

In terms of the emergence and development of an industry, the literature can be roughly divided into two categories – one on the analysis of particular cases of industry emergence, and the other on general conditions that are underneath the emergence of an industry. For example, for the first case, Zhao et al. (2012) identify and analyze the growth path and the characteristics of the solar photovoltaic power industry by employing a multifaceted approach, including literature survey, statistical data investigation, law review, and regulation and policy. By using data on publications, patents, and firms combined with business history, Sanderson and Simons (2014) analyze how the solid-state lighting industry emerged out of light emitting diode technologies, which had advanced in the prior half a century, involving many researchers in universities, national laboratories, and firms from around the world. Maine et al. (2014) analyzed the emergence and development of the global nanobiotechnology industry by identifying, classifying and tracking firms with capabilities in both biotechnology and nanotechnology over time. Martin and Coenen (2015) try to understand the emergence of the biogas industry in the region of Scania in Southern Sweden by considering the interplay between technology, industry dynamics and institutions based on in-depth interviews with key stakeholders and firms.

For the second case, Ruan et al. (2014) examine through a case study how government can shape the development of a disruptive innovation through employing both promotional and restrictive policies and how the distinctive nature of such innovations influences the strategies of individual firms with relevant industry and institutional environment co-evolving. Foray and Raffo (2014) look at two issues - the general conditions and procedures involved in the emergence of a tool industry, and the other whether or not a tool industry is currently emerging in the area of education. These authors build a heuristic framework regarding the main conditions for the emergence of tool industries by using works on historical cases, and described an emerging population of firms specialized in educational tools and instructional technologies. Matti and Consoli (2017) study to what extent instruments at different levels of policy domains can be coordinated as part of the process of developing an industrial sector by using the case of Spanish wind energy sector. They confirm that with international commitments, governments of different levels deliver market signals, and provide financial support and mechanisms to lucid actors and respective capacities. That is, governments of different levels jointly play a key role in the sector development. By surveying the literature on the emergence of industries, Gustafsson et al. (2016) show that industry emergence is a three-stage process: the initial stage, the co-evolutionary stage, and the growth stage that leads to the birth of a new industry. In the initial stage, a disruption to the existing industrial order appears, triggering the co-evolution of technology, markets, and activity networks, leading to the identity of a new industry (or birth of a new industry).

Different from the literature on individual cases of success and the stages, transitions between these stages that exist in the emergence and development of an industry, our current work attempts to construct a more general picture by looking at the evolution of profits. It is because positive cash flow represents the fundamental factor behind the appearance of any industry.

Regarding market competitions, the literature can be roughly divided into the following tracks: management related issues, matters of innovation, and topics related to finance. Regarding issues of management, Schmidt (1997) shows that an intensifying competition increases the probability of liquidation, a positive effect on managerial effort, and reduces a firm's profits, a negative effect on efforts. Empirically, Flammer (2015) finds that domestic companies respond to tariff reductions by increasing their engagement in corporate social responsibility (CSR). This finding supports the view that CSR can be used as a differentiating strategy that separates companies from their foreign rivals. Gu (2016) shows a strong positive correlation between the investment in research and development (R&D) and product market competition. In particular, R&D-intensive firms are generally riskier and earn higher expected returns than R&D-weak firms. Dhaliwal et al. (2014) find that accounting conservatism is greater when there is a higher threat of new entrants as well as stiff existing competition. That is, strategic considerations shape the degree of how product market competition influences conditional conservatism. Castellucci and Podolny (2017) propose, with supporting anecdotes, that other than being content with exchange partners, high-status positions help their occupants

enter into new exchange relationships with partners of higher quality, while the positions undercut the firms' development of capabilities, leaving the firms less able with the resources provided by existing exchange relationships. Symeonidis (2017) maintains that both the number of strikes and the number of lost working days, as a result of strikes, increased significantly when competition intensified after the abolition of cartels in the UK in late 1950s. Chalioti and Serfes (2017) specify when higher risk reduces incentives for firms to invest in cost-reducing R&D and compete in the product market, and examine when some firms will strengthen while other firms will weaken incentives provided to their agents. Spiegler (2016) reviews the theoretical literature of the choice complexity in competitive markets by addressing what determines the amount of choice complexity in market equilibrium, what relation exists between choice complexity and aspects of payoff of the market outcome, and what role consumer protection measures play.

In terms of innovation, Hartley et al. (2013) compare three major public innovation strategies by showing that both private and public sectors have a number of drivers of as well as barriers to innovation. Wu (2012) proposes that the impact of technological collaboration on product innovation is contingent on market competition and sectoral technology characteristics by referencing to the literature of strategic alliances and innovation. Then the author uses data from 944 Chinese firms across five manufacturing sectors to confirm the conjecture. Harmancioglu et al. (2019) empirically look at the question of how a firm can achieve ambidexterity and find that the answer lies in the adoption of two important *organizational cultures* – willingness to cannibalize and willingness to combine existing knowledge. These cultures allow a firm to attain superior performance through the implementation of both radical *and* incremental (i.e., ambidextrous) innovations. Based on product descriptions from firm 10-K statements Kim et al. (2016) find that firms in competitive markets invest more heavily in R&D and corporate venture capital (CVC), and with increasing competition a shift away from internal R&D spending and into CVC occurs, where CVC is a way of exploiting external knowledge for the IT-producing industry. By exploring the relationship among market competition, technology innovation, and firms' rise to a higher generation of production technology, Qian and Wang (2017) find empirically how concurrent market and technology competition lead a firm to defer advancement, although these competitions drive technology advancement.

In terms of topics related to finance, by comparing noncompetitive and competitive industries, Giroud and Mueller (2011) find that only in the former case firms with weak governance have lower equity returns, worse operating performance, and lower firm value; these firms suffer from lower labor productivity and higher input costs, and make more value-destroying acquisitions, and tend to be targets of activist hedge funds. Peress (2010) demonstrates that under monopolistic competition with shares traded in perfectly competitive markets, firms insulate their profits by using their monopoly power to pass on shocks to customers. That stimulates stock trading, capitalization of private information and improvement in capital allocation. Cheng et al. (2013) uncover a positive relation between product market competition and earnings quality and one between such competition and the precision of public and private information held by investors and analysts. Bustamante and Donangelo (2017) suggests that competition wears away markups, exposing firms to more system risks, that the potential of increasing competition lowers incumbent firms' exposure to system risks, and that aggregate industry risk stands for a barrier to entry so that riskier industries become less competitive. By using retrospective cohort study and prescription claims from commercial health plans between 2008 and 2013, Dave et al. (2017) determined confirmatively the association between levels of market competition and changes in generic drug prices in the United States. By developing a 2-stage Bayesian game for the market competition of differentiated products and empirical tests, Stoughton et al. (2017) study the impact of competition on information production and investment efficiency. They find that with a fixed market structure competition makes firms less efficient to a first-best case because the firms acquire less information and investments.

Although the literature on market competition is huge, what is missing is the mechanism that underlies the emergence of such competition. To fill this gap, this paper establishes a conclusion on how market signals the potential of profits and encourages market competition.

As for the literature on the granularity of economies, it is the work of Xavier Gabaix (2011) that started this exciting area of scholarly exploration. Since the publication of this influential paper on the now well-known granular hypothesis, over one thousand papers as of this writing have been published on related topics and issues. This part of the literature can be roughly classified into two groups: empirical confirmations of the hypothesis and theoretical examinations on why the commonly employed macroeconomic reasoning of averaging out microeconomic shocks does not work in this particular scenario.

Regarding empirical confirmations, Miranda-Pinto and Shen (219) find that idiosyncratic firm-level shocks are important drivers of the Australian business cycle, where labor productivity shocks to the largest non-financial firms account for about 20–40% of the variation in Australian GDP growth during 2000 – 2018. Lucio et al. (2017) show that a small group of firms dominate exports in Spain. By using a data base covering the universe of French firms for the period 1990 – 2007, Giovanni et al. (2014) study how individual firms play their roles in generating aggregate fluctuations. Barrot and Sauvagnat (2016) find that negatively affected suppliers levy on their customers substantial output losses, which translate into significant market value losses that in turn spill over to other suppliers. By using data of the 50 largest economies in the world, Giovanni and Levchenko (2012) find that idiosyncratic shocks to large firms have an impact on aggregate volatility with small countries experiencing higher volatility, and that with increasing importance within the globalizing economy, large firms raise macroeconomic volatility, and can increase the aggregate volatility of some small open economies by 15-20%. Carvalho (2014) discusses by using examples how the propagation of sectoral shocks – and hence aggregate volatility – depends on the underlying production network and develops empirically properties of production networks. Hottman et al. (2016) empirically show that the imperfect substitutability of products within firms and large numbers of products offered by large firms imply that standard productivity measures depend highly on implicit demand system assumptions and dramatically understate the relative productivity of the largest firms. Amiti and Weinstein (2018) show that supply-side financial shocks have a large impact on firms' investment by using Japan's data for the period 1990 – 2010. Cravino and Levchenko (2017) show empirically that for a typical country the impact of foreign shocks cannot be ignored due to the combined effect of foreign multinationals and that the most integrated countries are significantly more affected by foreign shocks than others.

In terms of theoretical examinations, based on stochastic simulations Roson and Sartori (2016) find that changes in the GDP, induced by sectoral shocks, is mostly determined by the degree of industrial concentration and the degree of centrality in inter-industrial connectivity is correlated with the industrial concentration index. Acemoglu et al. (2012) argue that intersectoral input–output linkages help facilitate the lift of microeconomic idiosyncratic shocks to aggregate fluctuations. This work highlights that sectoral idiosyncratic shocks lead to sizable aggregate volatility only when there exists significant asymmetry in the roles sectors play as suppliers to others. Foerster et al. (2011) characterize the Great Moderation as a fall in the importance of aggregate shocks with the volatility of sectoral shocks mostly unchanged. By looking at the hypothesis that macroeconomic fluctuations are primitively the results of many microeconomic shocks, Carvalho and Gabaix (2013) reveal that the initial great moderation is due to a decreasing share of manufacturing between 1975 and 1985 and the recent rise of macroeconomic volatility due to the growth of the financial sector. By quantifying the contribution of sectoral shocks to business cycle fluctuations in aggregate output, Atalay (2017) develop a multi-industry general equilibrium model in which each industry employs the material and capital goods produced by other sectors. Acemoglu et al. (2015) develop a unified framework for the study of how network interactions can function as a mechanism for propagation and amplification of microeconomic shocks. Veldkamp and Wolfers (2007) explore complementarity in information acquisition instead of that of production, suggesting that sectoral sharing makes information markets amplify business-cycle co-movement. By offering a nonlinear characterization of the macroeconomic impact of microeconomic productivity shocks, Baqaee and Farhi (2019) demonstrate that in a business-cycle calibration with sectoral shocks, nonlinearities amplify negative shocks and weaken positive shocks. By developing a quantitative theory of aggregate fluctuations caused by firm-level disturbances alone, Carvalho and Grassi (2019) explore the role of large firm dynamics in shaping aggregate fluctuations.

What is missing in this literature is the consideration of the evolutionary fact that large firms tend to stay large in their markets for at least a (either short or long) period of time. By combining this fact and the thinking logic of trades (that underlie revenues and profits of firms or industries), this paper is able to establish results on when the granular hypothesis holds true in general and when it fails definitely.

MARKET EVOLUTION: A SIMPLIFIED APPROACH

This section provides a simplified theoretical picture on how an industry appears, grows, and matures over stages in terms of sales and market competition. The first subsection focuses on appearance and growth, while the second subsection looks at maturity and aging.

Emergence and Development of an Industry – Seen from the View of Profits

The emergence of a new industry represents a three-stage process: the initial stage, the co-evolutionary stage, and the growth stage that leads to the birth of a new industry (Gustafsson et al., 2016). In the initial stage, one or a few disruptive innovations first appear, suspending the existing equilibrium among existing industries. At this stage, the disruptive innovations, as a matter of any innovation, be it disruptive or incremental, on either the producer side or the demand side are generally brought forward by particular talents who suddenly and randomly hit on some bright ideas (Ridley, 2016). For example, Ye at al (2012) analyzes a case of how a firm innovatively created simultaneous consumer utilities by offering a collocated assortment of products and/or services to consumers. Specifically, a state university in northern USA has a student body of over 29,000. These students are mostly in their undergraduate programs, unmarried and live on tight budgets. Considering the characteristics of young people, both physically and mentally active and always busy with different kinds of activities, such as their school assignments and part-time works, most of the rental properties, aiming at the students, do not offer laundry facilities due to various reasons such as that specific labor force is needed to maintain the fragile equipment. So, some other local businesspeople serve the students by providing self-servicing coin-operated laundromats, located near the campus. Additionally, because of long and cold winters of the region, mostly college female students are attracted to indoor tanning salons, another successful college-town business in northern USA.

With associative thinking, two entrepreneurs offer simultaneously a coin-operated self-service laundry facility and an indoor tanning service at a convenient single location. These businessmen first fashion in thoughts and then produce in practice consumer synergies by combining these two commonly available assets. In this case, the overhead costs remain roughly the same as if they operated the operations separately, because these services require different sets of equipment; and so do the labor costs, because the combined laundry and tanning services require different skills for production and customer service. However, these joined business service operations generate magnificent amounts of demand-side synergies because of the following two reasons:

Such activities as washing clothes and tanning skin can be carried out simultaneously, saving the otherwise unproductive and costly waited time (beyond completing their homework, the students have to work to make their tight budgets sufficient for all of their living and school expenses); and a nice location and convenient opportunity are provided and created for students to establish relationships. The single location attracts females to the tanning service while enjoying the convenience of simultaneous clothes washing. The large number of single females also attracts a large number of males to use the laundry facility.

In this business scenario, because of the created consumer or demand-side synergies, the business owners are able to collect higher fees from the laundry service than other single-purpose stores, while maintain competitive pricings for the tanning service, the demand of which in turn grows substantially due to heavy flows of male users of the laundry facility. In other words, the pooled services for the student consumers generate a greater value, which is also handsomely netted by business owners because of the innovatively created consumer synergies from product-and-service diversification.

Based on how historically innovations appear (Ridley, 2016), how collaborations lead to innovations (Hartley et al., 2013; Wu, 2012), the previous example and many other similar anecdotes, we can see readily the following fact. When one or a few entrepreneurs are able to spot a business opportunity through their intimate knowledge of particular resources, business models, and/or circumstances involved (Ye, et al., 2012), these capable people foresee the possibility of introducing a brand-new kind of product, practically produce or have the imagined product produced and then consequently offer the product to the market. When a market particular to the product and related substitutes gradually forms with an increasing number of customers and rising consumer spending, the quality of the particular group of products improves with widening acceptance and usage of the product. At the same time, the technology employed to make the products becomes standardized, which helps lower the production cost (Forrest, et al. 2018).

Assume that during this stage of development, the gradually appearing market is served by m firms, named Firm m (= 1, 2, …). These firms provide customers with mutually substitutable products. Because of the novelty and freshness of the products, no customer is loyal to any particular firm. On the other hand, the firms have to apply adjustable prices to attract customers who make purchase decisions based on whose price is more competitive. In the rest of this paper, we will refer to such customers as switchers. Let β be the magnitude of the market segment of all switchers, which is in this stage of market development equal to the sum of all customers and potential customers. To make our

analytical reasoning possible, assume that these firms produce horizontally differentiated products at constant marginal costs, which are set to zero without loss of generality. Assume additionally that to serve the emerging and growing market well, the managements of these firms share their pricing strategies with each other so that they individually establish their best responses by playing the Nash equilibrium through pure self-analyses.

Because the product market is in a certain sense still emerging, one can treat each of the *m* firms as an entrant into a brand-new and unoccupied market, where the firms will be considered doing well as long as they make profits. Practically speaking, this end implies that each of these firms uniformly randomizes its selling price *P* over the interval [C, R] as long as the firm could make profits on the average, where C = 0 stands for the cost of production, R the reservation price customers are willing to pay for the product. Without loss of generality, we let R = 1. That is, each firm uniformly randomizes its selling price *P* over the interval [0,1] as long as the firm could make profits on the average

If there is only one firm serving the emerging market, that is, $m = 1$, then the profit the firm makes is

$$\text{market occupency} \times \text{price} = \beta P = \beta(1-P)^0 P = \beta P(1-P)^{m-1}.$$

If there are two firms, $m = 1, 2$, that serve the market, then each firm's profit is

$$\text{each firm's market occupency} \times \text{price} = \beta(1-P)^1 \times P = \beta P(1-P)^{m-1},$$

where the reason why these firms set their selling price P the same is because if not, customers will make their purchases from the firm of lower price, say Firm 1. So, the demand for Firm 1's product increases and that for Firm 2 decreases, forcing Firm 2 to lower its price. Eventually, the prices charged by these firms have to be equal to each other if they want to stay in business.

By continuing the reasoning above, we see that if there are three firms, $m = 1, 2, 3$, that serve the market, then each firm's profit is

$$\text{each firm's market occupency} \times \text{price} = \beta(1-P)^2 \times P = \beta P(1-P)^{m-1}.$$

So, by using mathematical induction, we have the following general result:

Proposition 1. In the afore-described emerging market, if there are *m* firms that serve the market, $m = 1, 2, 3, \ldots$, then each firm's profit Π is equal to

$$\Pi = \beta P(1-P)^{m-1}. \tag{1}$$

In the next stage of development and the emergence of a new industry, as triggered by the initial stage of disruption to the existing industrial order, relevant technologies, markets, and activity and organizational networks develop simultaneously along with increasing severity of competition among firms (Gustafsson et al., 2016). So, some firms thrive, some barely survive and most others fail (Markman & Waldron, 2014). Except those firms that have failed, some of the *m* firms, as discussed above, become established so that each of them enjoys a base of loyal customers. Without loss of generality, assume that all these m firms survive the previous stage of development. Let α stand for the magnitude of the established Firm *i*'s base of loyal customers. So, $\beta = 1 - m\alpha$ is the magnitude of the market segment of switchers. Known as consumer surplus, where we assume that both β and α have been normalized so that $\alpha, \beta \in [0,1]$ and $m\alpha + \beta = 1$. By analyzing similarly as above, we have the following result:

Proposition 2. In the afore-described developing and stabilizing market, if $F_i(P)$ represents the price distribution of incumbent Firm *i*, $i = 1, 2, \ldots, m$, then Firm *j*'s profit Π_j is equal to

$$\Pi_j = \alpha P + \beta P \prod_{\substack{i=1 \\ i \neq j}}^{m} [1 - F_i(P)]. \tag{2}$$

In fact, if $m = 1$, the profit of Firm 1 is the sum of its profit αP from the loyal customers and that from the consumer surplus βP. Symbolically, we have

$$\text{Profit of Firm } 1 = \Pi_1 = \alpha P + \beta P.$$

If $m = 2$, the profit Π_i of Firm i is equal to the sum of its profit αP from the loyal customers and that from the consumer surplus $\beta P(1 - F_j(P))$, for $i, j = 1,2, i \neq j$. Symbolically, we have

$$\alpha P + \beta P \prod_{\substack{j=1 \\ j \neq i}}^{2} [1 - F_j(P)].$$

So, equation (2) follows by using mathematical induction for every Firm j.

In the previous discussion, although each firm's cost C of production is normalized to 0 and the reservation price R customers are willing to pay for their products to 1, the normalization in practice means that Firm i charges price P_i for its product equal to or above its cost of production. That is, in the previous theoretical reasoning, although the selling price P is treated as the same, it is practically different from one firm to another in real life, where the applied normalization does not exist. In other words, the sales' price P_i of Firm i is different of P_j of Firm j; but proportionally, these prices are the same in terms of their relevant cost C_k and reservation price R_k, for $k = i, j$. Symbolically, there are parameters $\alpha_k \in [0,1]$ satisfying that

$$P_k = C_k + \alpha_k(R_k - C_k), k = 1,2.$$

So, the normalization of the prices means that we identify P_k with α_k; and the same selling price means that the individual firms' prices satisfy the following condition: $(P_i - C_i)/(R_i - C_i) = (P_j - C_j)/(R_j - C_j)$. For more discussion regarding this normalization, see the following subsection.

With the initial stage of disruption to the existing industrial order in the past, the relevant technologies and markets developed, and activity and organizational networks established, the emergence of a new industry enters into its third stage – birth of the industry, where the industry acquires its identity (Gustafsson et al., 2016). Other than studying the emergence and development of a new industry from different angles, such as conditions for an industry to appear (Foray & Raffo, 2014), identification, classification and tracking firms' capabilities (Maine et al., 2014), policies (Matti & Consoli, 2017), business history (Sanderson & Simons**,** 2014), interplay of technology, industry dynamics and institutions (Martin & Coenen, 2015), roles of governments (Ruan et al., 2014), growth path and characteristics (Zhao et al., 2012), etc., this subsection focuses on profits, the driving force behind individual firms' devotion of time, efforts and resources.

Market Competition

Because preferences and tastes of customers evolve constantly, it is inevitable for new switchers to emerge either out of the loyal customers or new customers in the afore-described product market, especially if the incumbent firms become risk avert and comfortable with their market positions and levels of profits they are making, as suggested by Podolny (1993) when the market is seen as a hierarchy of status orders. So, we have the following natural question: Do evolving preferences and tastes of customers mean that new competition will appear in the product market? To this end, we have the following:

Proposition 3. In Nash equilibrium, if the consumer surplus satisfies $\beta = 1 - m\alpha > 0$, then at least one new firm will enter the afore-described market as a competitor of the incumbent firms, while the expected total profit of all entrants is directly proportional to β.

Proof. For the part of showing that at least one new firm will enter into the afore-described market as a competitor of the incumbent firms, see the technical proof of Theorem 1 in (Forrest, et al., 2019b). For the rest of this proof, we focus on showing that the combined profit of all entrants is directly proportional to β.

To this end, assume that there is only one entrant that uniformly randomizes its price P over the interval [0,1] as long as the firm could make profits on the average. Here, 0 stands for the normalized constant marginal costs of the entrant and all incumbents and 1 those of the reservation prices individual customers loyal to their respective incumbent firms are willing to pay to buy their firms' products. Let $F_j(P)$ be the price distribution of incumbent Firm j. Then, the expected profit of the entrant is given by:

$$E(\Pi) = \int_0^{\alpha/\beta} \beta P dP + \int_{\alpha/\beta}^{+\infty} \beta P \prod_{i=1}^{m} [1 - F_i(P)]\, dP, \tag{3}$$

where the first term in the right-hand side of equation (3) stands for the expected profit of the entrant when it charges the lowest price in the marketplace and captures the entire segment of the switchers, and the second term is the entrant's expected profit when it is in direct competition with the m incumbent firms. Therefore, we have

$$\begin{aligned} E(\Pi) &= \beta \left\{ \int_0^{\alpha/\beta} P dP + \int_{\alpha/\beta}^{+\infty} P \prod_{i=1}^{m} [1 - F_i(P)]\, dP \right\}. \\ &= \beta \left\{ \frac{\alpha^2}{2\beta^2} + \int_{\alpha/\beta}^{+\infty} P \prod_{i=1}^{m} [1 - F_i(P)]\, dP \right\} \end{aligned} \tag{4}$$

Now, in Nash equilibrium, there is only a symmetric pricing strategy for the incumbent firms (Forrest et al., 2019b) such that

$$F_i(P) = F(P) = 1 - \left(\frac{\alpha}{\beta P}\right)^{\frac{1}{m-1}}. \tag{5}$$

So, the second term in the braces of equation (4) can be rewritten as follows:

$$\int_{\alpha/\beta}^{+\infty} P \prod_{i=1}^{m} [1 - F_i(P)]\, dP = \int_{\alpha/\beta}^{1} P[1 - F(P)]^m dP + \left(\frac{\alpha}{\beta}\right)^{\frac{m}{m-1}}, \tag{6}$$

because $\lim_{P \to 1^-} F(P) = 1 - (\alpha/\beta)^{\frac{1}{m-1}} < F(1) = 1$, meaning that the cumulative distribution function $F(P)$ has a jump discontinuity at the reservation value $P = 1$, where the amount of jump is $(\alpha/\beta)^{\frac{1}{m-1}}$. That is, $F(P)$ has a mass point of size $(\alpha/\beta)^{\frac{1}{m-1}}$ at the reservation value $P = 1$.

Because $0 \leq P[1 - F(P)]^m \leq 1$, the first term on the right-hand side of equation (6) is a positive real number. So, the term in the braces in equation (4) is a positive real number. That implies that the expected profit of the entrant is directly proportional to the magnitude β of the consumer surplus. This ends the proof of Proposition 3.

Summarizing the proof and the statement of Proposition 3, we see that from observing the development and growth of the newly emerging, while stabilizing, market, other business players want to share some of the visible and potentially increasing magnitude of profits. This conclusion holds true even if the industry that serves the market is risky, which is opposite to what was suggested by Bustamante and Donangelo (2017). On the other hand, increasing competition helps reduce the price of the product, benefiting consumers (Dave et al., 2017). That is, when the market competition increases, it forces the management of the incumbent firms to devote more of their effort and intelligence into their companies' governance (Schmidt, 1997) and designs of new strategies, such as applying greater accounting conservatism (Dhaliwal et al., 2014), embracing social responsibilities (Flammer, 2015), investing more in research and development (Gu, 2016), in order to strengthen their competitive advantage in the product market through improved efficiency of governance (Giroud & Mueller, 2011) and their companies' behaviors in the equity market (Peress, 2010).

An important note at this junction is the normalization of the constant marginal costs of all firms considered above to 0, and the conservation price of loyal customers to 1. It practically means that each competing firm sells its product at such a price that is between its marginal cost and a profit. Because in real life, the marginal cost varies from one firm to another, the selling prices for their products of competing firms are not really the same (for details on this, see the relevant discussion in the previous subsection). This understanding leads to the following conclusion based on Proposition 3: When a firm introduces a product with advanced features, the actual selling price can be literally higher than any of the other prices in the marketplace. In this case, market switchers judge whose price is "lower" by considering the product features comprehensively. For example, an old-fashioned walkie-talkie can be on sale at a very low price compared to that of an iPhone. However, market switchers mostly likely purchase iPhones of versatile functionalities instead of old-fashioned walkie-talkies made for a single, monotonic purpose, because the much higher absolute price of iPhones is practically considered "low" in terms of the functionalities involved when compared to that of walkie-talkies. This end both theoretically and practically implies that firms, either incumbent or not, need to address the question of how to achieve ambidexterity in their innovations – attain superior performance through the implementation of both radical *and* incremental (i.e., ambidextrous) innovations (Harmancioglu et al., 2019). To accomplish this end, an important first step is surely about how to understand market information, as indicated by an increasing consumer surplus (Forrest et al., 2019a), how to invest efficiently (Stoughton et al., 2017) and how to make use of venture capitals (Kim et al., 2016). Due to differences in cognitive abilities, out of the same piece of market information, such as increasing consumer surplus, entrepreneurs tend to introduce different products to satisfy the same demand, creating the so-called choice complexity (Spiegler, 2016). With increasing choice complexity in the marketplace, competing firms are encouraged to adopt production technologies of higher generations (Qian & Wang, 2017).

Assume that the m incumbent and established firms are named, respectively, m_1, m_2, m_3, …, and that each of them enjoys a base of loyal customers of magnitude α, while other n firms, as new entrants, named n_1 , n_2, n_3, …, still operate as the firms described in the beginning development stage of the market. These n firms compete over the market surplus with each other and with the incumbent firms. Now, similar to the arguments of Propositions 1-3, we have the following result.

Proposition 4. For each of the n new entrants, its profit is equal to

$$\beta P(1-P)^{n-1}\prod_{i=1}^{m}[1-F_i(P)]. \tag{7}$$

And for incumbent Firm m_j, its profit is equal to

$$\alpha P + \beta P(1-P)^{n}\prod_{\substack{i=1\\ i\neq j}}^{m}[1-F_i(P)]. \tag{8}$$

When the market evolves into the stage of maturity, incumbent firms will generally have well established their status positions in the marketplace, a state known as mutual forbearance in the literature. That is when the incumbent firms alleviate the intensity of their competition by partitioning their market into sectors proportional to the firms' individual strengths (Bernheim & Whinston, 1990). Consequently, each firm surrenders its struggle to stronger ones in those sectors where it is less capable (Li & Greenwood, 2004). So, these incumbent firms become inter-reliant in their controlling of the market. Such equilibrium state of market competition stimulates the firms to detain their oppositions (Yu & Cannella, 2012), leading to decreased number of entries into and exits from the market (Fuentelsaz & Gómez, 2006), while inter-firm hostility lessens (Haveman & Nonnemaker, 2000). The reduced intensity of market competition also helps boost employees' satisfaction so that the number of strikes could be potentially reduced (Symeonidis, 2017). And decreased number of entries into the market stimulates firms to invest in cost-reducing R&Ds (Chalioti & Serfes, 2017).

Other than being content with their upstream-downstream partners, these firms' status positions help them to enter into new relationships with partners of higher quality, while the firms' status positions undercut the firms'

development of capabilities within their boundaries. That leaves the firms less able to mobilize existing internal resources and those provided by partners (Castellucci & Podolny, 2017). The growing incapability gradually pushes the firms and their industry into old age, which is characterized by disappearing or stabilizing consumer surplus (Proposition 3). So, according to Proposition 3, no more new business players want to enter the market as suppliers, while each incumbent firm makes its profits in the amount of αP, where the value of α also dwindles over time due to decreasing market competition and deteriorating earnings (Cheng et al., 2013).

Granularity of An Industry or Economy

Opposite to the previous section, where our focus is on firm-level performances in terms of profits, this section considers how firm-level activities can affect phenomena of much larger scale economies, such as an industry, than the scales of individual firms. Conventionally, various scholars have reasoned that distinctive micro-level shocks to individual economic agents do not lead to aggregate oscillations of the much larger economic structure, such as industry or economy, of the agents, because firm-level shocks tend to happen in different forms and varied strengths; when these micro-firm level shocks are aggregated, their opposing and/or complementing forms and strengths will cancel each other and get averaged out at the much larger industry and economy level (Lucas, 1977; Wagner, 2012). For example, the literature of temporary equilibrium emphasizes on the existence of compatibility beliefs among individual agents for a much large-scale equilibria to exist, because differences in individual beliefs are smoothed out (Green, 1973; Hart, 1974). And in economics, a powerful paradigm is developed on that individual preferences are homogeneous across economic agents with individual differences assumed away (e.g., Lee & Sato, 1993; Stigler & Becker, 1977). This paradigm has helped explain many economic and social phenomena. However, our results analytically established in this section show that such conventional logic of reasoning is not generally true.

To this end, let $S(t)$ be the total sales of an industry that serves the product market discussed previously at a freezing moment of time *t*. Let $X(t)$ stand for the sales of one or a set of top performing firms within the industry and $Y(t)$ the sales of the rest of the firms within the industry. Then, we have

$$S(t) = X(t) + Y(t). \tag{9}$$

If the ratio of the sales of the particular firm or the set of top performing firms within the industry is equal to $r(t)$, that is, $X(t)/(X(t) + Y(t)) = r(t)$, we then have

$$S(t) = \frac{X(t)}{r(t)}. \tag{10}$$

So, the rate of change in $S(t)$ over time is given by

$$\frac{dS}{dt} = \frac{r \cdot \frac{dX}{dt} - X \cdot \frac{dr}{dt}}{r^2}. \tag{11}$$

Proposition 5. If the ratio $r(t)$ of the sales $X(t)$ of a particular firm or a particular set of top performing firms over the sales $S(t)$ of the entire industry is a constant or experiences little change over a time period, then within this time period changes in $X(t)$ influence directly those in $S(t)$.

In fact, if $r(t)$ is equal to a constant or experiences little change over a time-period, then $dr(t)/dt = or \approx 0$ holds true for this time period. So, equation (11) implies $dS(t)/dt = or \approx \frac{1}{r} dX(t)/dt$, where r is equal to a constant or roughly equal to a constant. That is, changes in $S(t)$ are directly proportional to changes in $X(t)$ over the said time-period.

What Proposition 5 says is that idiosyncratic firm-level shocks, experienced by one or several good performing firms, either individually or collectively, that play an important role in an industry can explain an important part of aggregate economic movements of the industry and provide a micro-foundation for aggregate shocks. What is theoretically extremely significant about this result is that it is contrary to the well-accepted macroeconomic reasoning that idiosyncratic microeconomic shocks to individual firms do not lead to large aggregate fluctuations of the industry for

the reason that these firm-level shocks cancel each other and get averaged out at the macroeconomic level (Lucas, 1977; Wagner, 2012).

Empirically, Gabaix (2011) is the first person who proposes that idiosyncratic firm-level shocks can indeed affect aggregate economic phenomena in the case of the United States, where the idiosyncratic movements of the largest 100 firms can explain about one-third of variations in the national output growth. Based on this discovery, Gabaix believes that many macroeconomic phenomena are caused by or attributable to the firm-level activities of the incompressible grains, the large firms. He then names this belief as the granular hypothesis. Following this research by Gabaix (2011), Wagner (2012) looks at the German manufacturing sector by studying the data for enterprises from 23 manufacturing industries for the time-period 2005-2008 and by considering the role of the 10 largest firms in each industry. His results are supportive of the granular hypothesis, leading to the conclusion that the German manufacturing sector is a granular economy. Lucio et al (2017) confirms the granularity characteristics of Spanish economy by showing that in 2015 the top 200 firms were responsible for half of Spanish exports, while such concentration had been roughly maintained over the 1997–2015 period and these firms explained around one-third of the growth in Spanish exports. Similarly, Miranda-Pinto and Shen (2019) confirm that labor productivity shocks to the largest non-financial firms in Australia account for a large percentage of the variation in Australian GDP growth over the period 2000–18, while firms in the energy, construction, transportation, and consumer services sectors also seem to be drivers of GDP growth.

Next, let us look at the case when $r(t)$ is not equal to a constant over any time-period. For this case, we consider three scenarios separately:

$dS(t)/dt = 0$;
$dS(t)/dt > 0$; and
$dS(t)/dt < 0$.

For case (i), we have $r(t) \times dX(t)/dt = X(t) \times dr(t)/dt$. Solving this separable differential equation produces $X(t) = Cr(t)$, where C is a constant. That is, we have the following general result, which describes when the general averaging argument for why we can discard the possibility that idiosyncratic microeconomic shocks to individual firms may lead to large aggregate fluctuations of all firms within an industry (Lucas, 1977):

Proposition 6. If the sales $X(t)$ of a particular firm or a particular set of top performing firms is directly proportional to the ratio $r(t)$ of $X(t)$ over the sales $S(t)$ of the entire industry, then no firm-level shocks to these particular firms will bear any direct effect on macro-movements of the industry.

For case (ii), we have $r(t) \times dX(t)/dt > X(t) \times dr(t)/dt$. The situation can be divided into two cases: (a) $dr(t)/dt < 0$ and (b) $dr(t)/dt > 0$. If case (a) holds true, then we have the following practical conclusion:

Proposition 7. If (1) each individual firm's performance improves, or stays stable, or does not drop much and (2) its weight in the entire industry shrinks, then the total sales of the industry increase, where the first if-condition means

$$dX(t)/dt > -|[X(t)/r(t)] \times dr(t)/dt|. \quad (10)$$

The theoretical and practical significance of this result is the following implication: When an economy operates within its norm (or not in any crisis), market competition is beneficial to the growth of the industry, where competition reduces individual firm's influences on the entire industry.

On the other hand, for case (ii) and (b) when $dr(t)/dt > 0$, meaning that jointly some firms weigh increasingly more than before within the industry they belong to, the sales of these firms have to grow tremendously in order to maintain a positive growth of the industry. Summarizing this analysis, we have

Proposition 8. If some firms' joint influence within their industry increases, then these firms have to grow in large scales (or $dX(t)/dt > +[X(t)/r(t)] \times dr(t)/dt$) in order to help propel a positive growth for the industry.
Indirectly, this result implies that when the proportion of the sales of one or a few firms increases within the total sales of their industry, continued positive growth in the sales of the industry will become difficult to maintain.

For case (iii) where $dS(t)/dt < 0$, we have that $r(t) \times dX(t)/dt < X(t) \times dr(t)/dt$ with shrinking sales of the industry. If $dX(t)/dt \geq 0$, then we must have $dr(t)/dt \geq 0$. That means that top performing firms are gaining further dominance in the declining industry. Proposition 3 indirectly indicates that the industry is losing its attraction to customers.

If $dX(t)/dt < 0$, there are two cases: (a) $dr(t)/dt \geq 0$ and (b) $dr(t)/dt < 0$. Here, case (a) means that along with the declining sales of the industry, the top performing firms also experience dwindling sales, although the weight of the firm or the set of firms within the industry still either stays the same or even increases. Case (b) implies that within the industry of declining sales, the top performing firms are not doing as well as before in terms of their sales and dominance in their industry. Once again, Proposition 3 indicates that the economy is aging quickly.

Summarizing the discussion in the previous paragraphs, we have the following conclusion:

Proposition 9. If the sales of an industry decline, assuming that all other conditions stay unchanging, then the industry is either losing attraction to customers temporarily or aging quickly.

Although Propositions 5 – 9 are phrased in terms of industries, the term "industry" can be readily replaced by "economy".

The significance of the results established in this section can be highlighted by glancing through the scholarly efforts devoted by many authors since 2011 when Gabaix (2011) initially introduced his granular hypothesis. For example, Hottman et al. (2016) and Atalay (2017) use econometric approaches to confirm the phenomenon of economic granularity. Acemoglu et al. (2015) employ classes of games to examine how network interactions can function as a mechanism for propagation and amplification of microeconomic shocks. Foerster et al. (2011) apply structural factor analysis to discover that nearly all variabilities in industrial productivity are associated with common factors. Acemoglu et al. (2012), Carvalho (2014), Barrot and Sauvagnat (2016) and Boehm et al. (2019) utilize the concept of either business or production networks to find that sectoral idiosyncratic shocks lead to sizable aggregate volatility only when there exists significant asymmetry in the roles sectors play as suppliers to others. Giovanni et al. (2014) use methods of decomposition to confirm that firm-specific component contributes substantially to aggregate sales volatility. Roson and Sartori (2016) employ stochastic simulations to analyze how sectoral shocks affect changes in the GDP. In comparison, our results in this section show directly when the granular hypothesis holds true by focusing on sales of individual firms and their industries.

The Granularity of German Economy - Numerical Case Study

The basic setup for Gabaix's granular hypothesis is the existence of "incompressible grains" in an industry or economic sector. So, one of the first questions that is both practically and theoretically important to empirically confirm is the following: Is there such an economy or economic sector or industry within which no firm and no set of top preforming firms stay on the top for long? Theoretically, Propositions 1 and 3 jointly indicate that if such an economic scenario exists, the economy or economic sector or industry of concern has to be at the emerging and quickly expanding stage of development. Unfortunately, the data set available to us for this study reflects only certain aspects of the well-developed German economy. So, in this paper, we will not check on this question empirically. Instead, we focus on empirically confirming the granularity of German economy by using conclusions developed earlier in this paper.

Discretization of Two Established Conclusions

To numerically employ what is established above, let us first discretize equation (11) as follows:

$$S(t+1) - S(t) \cong \frac{r(t)[X(t+1) - X(t)] - X(t)[r(t+1) - r(t)]}{r^2(t)} \cong \frac{[X(t+1) - X(t)]}{r(t)}$$

if $X(t)[r(t+1) - r(t)] \cong 0$. So, Proposition 5 implies the following two results

Proposition 10: When

$$S(t+1) - S(t) \cong \frac{[X(t+1) - X(t)]}{r(t)}, \tag{11}$$

Gabaix's granular hypothesis holds true, where t stands for a time moment and $(t+1)$ the following time moment.

In other words, what this proposition says is that when the growth in the sales $S(t)$ of an industry from time moment t to the next moment $(t+1)$ is roughly proportional to the growth $X(t)$ of one top-performing firm or a set of top-performing firms within the industry for the same time period, then Gabaix's granular hypothesis holds true. To empirically confirm this end, the roughly constant proportionality needs to be confirmed over several time periods, say from t to $t + k$, for k = 2, 3, 4, …

Proposition 11: When $X(t)[r(t+1) - r(t)] \cong 0$, Gabaix's granular hypothesis holds true.

To empirically verify this conclusion, let the when-condition be identified as follows: If the magnitude of $S(t+1) - S(t)$ is in 10^n, while that of $X(t)[r(t+1) - r(t)]$ is in 10^{n-4}, then we treat $X(t)[r(t+1) - r(t)]$ as roughly equal to 0. For instance, the dollar value \$900.00 = $\$9.00 \times 10^2$ is in the magnitude of 10^2; and the dollar value \$0.09 = $\$9.00 \times 10^{-2}$ can be seen as roughly \$0.00 when compared to the original value of \$900.00.

As for when Gabaix's granular hypothesis is definitely false, from Proposition 6 we have

Proposition 12: If $X(t) = Cr(t)$, for some constant C, then Gabaix's granular hypothesis does not hold true.

Speaking differently, what Proposition 12 says is that no firm-level shocks to these particular firms involved in the computation of $X(t)$ will bear any direct effect on the macro-movement $S(t)$ of the industry. To empirically confirm this conclusion, we need to find such constant C that satisfies $X(t) = Cr(t)$, for at least a few consecutive time periods. If such an industry and a time frame can be located, then we have shown that Gabaix's granular hypothesis does not hold true for this industry and time frame.

THE DATA

The following empirical exercise uses new and yet unreleased data on the top 100 companies in Germany that are prepared by the German Monopolies Commission. These are official data and can be regarded as high-quality. Although the data are not yet publicly known, in a forthcoming paper, Buchwald et al. (2020) provides a detailed description about the data.

Because the data do not contain any information of sales of individual companies, as discussed in the previous sections, instead we will use the information on the number of employees in each company for every other year from 1976 to 2016, and on the total number of employees in the German economy as a whole. This substitution is both empirically and theoretically confirmed as reasonable by various scholars (e.g., Camison-Zornoza et al., 2004; Forrest et al., 2019b; Stock et al., 2002), because the number of employees tends to be highly, positively correlated with sales and values added at the firm level. So, symbolically, we employ the following corresponding substitutions: $S(t)$ is the total number of employees in German economy in year t; $X(t)$ the total number of employees in the top 100 companies in Germany in year t; and

$Y(t) = S(t) - X(t)$ and $r(t) = X(t)/(X(t) + (Y(t))$.

THE CALCULATIONS

Tables 1 and 2 display all the calculations of the symbolic components in Propositions 10 – 13, where if needed, the natural log function is applied (say, Table 2).

Table 1 Computations related to Propositions 10 and 11

$t+1$	t	$S(t+1) - S(t)$	$[X(t+1) - X(t)]/r(t)$	$X(t)[r(t+1) - r(t)]$
1978	1976	1830780	1349422	-13898.66
1980	1978	474600	323152.9	-4477.422

1982	1980	-743792	-545848.3	6136.589
1984	1982	-1712	-585526.9	-17782.91
1986	1984	514612	639962.1	68582.42
1988	1986	470204	-99590.44	-3616.084
1990	1988	1373004	1481618	-71355.58
1992	1990	436116	1171648	20291.19
1994	1992	4014008	2993220	-25926.66
1996	1994	-811924	-2026183	-34794.52
1998	1996	-36316	-697481	-16628.88
2000	1998	468904	-316699.2	-18350.22
2002	2000	-404928	-1371957	-21960.66
2004	2002	-1175988	-769930.5	8799.194
2006	2004	268050	-814386.6	-22863.14
2008	2006	922004	-247389.1	-21939.72
2010	2008	305646	-715182.9	-17849.54
2012	2010	1053540	703638.5	-5474.085
2014	2012	952324	2737397	27338.05
2016	2014	1330068	390130.7	-16143.92

Proposition 10 says that Gabaix's granular hypothesis holds true if in Table 1, the column of $S(t+1)-S(t)$ is about equal to the column of $[X(t+1)-X(t)]/r(t)$. However, this is not the case. And, Proposition 11 says that Gabaix's granular hypothesis holds true if the column of $X(t)[r(t+1)-r(t)]$ is about equal to 0. Once again, Table 1 indicates that this is not the case. On the other hand, Proposition 12 says that Gabaix's granular hypothesis does not hold if C is constant over consecutive time periods. To this end, Table 3 shows that this is the case, say, for example, the time periods 1976 – 1988 and 1994-2002. Hence, summarizing this discussion, we conclude that Tables 1 and 2 displays evidence that the German economy is not a granular economy, because Proposition 10 and Proposition 11 do not hold while Proposition 12 holds over some periods.

Table 2 Computations related to Proposition 12

t	1976	1978	1980	1982	1984	1986	1988
$C(t)=X(t)-r(t)$	1.74e+07	1.92e+07	1.97e+07	1.89e+07	1.89e+07	1.74e+07	1.74e+07
t	1990	1992	1994	1996	1998	2000	2002
$C(t)=X(t)-r(t)$	2.13e+07	2.17e+07	2.57e+07	2.49e+07	2.49e+07	2.54e+07	2.50e+07
t	2004	2006	2008	2010	2012	2014	2016
$C(t)=X(t)-r(t)$	2.38e+07	2.41e+07	2.50e.07	2.53e+07	2.63e+07	2.73e+07	2.86e+07

A ROBUSTNESS TEST

To confirm our conclusion of the previous subsection, let us use the approach suggested by Gabaix (2011) by using employment figures instead of those of productivity as the test variable. Based on equations (29), (30) and (33) in Gabaix (2011), we compute the granular residuals, including those of one-period lag and two-period lag, and regress the growth rate of the economy on the granular residual. The results are reported in Table 3.

Table 3 Explanatory power of the granular residual for growth in total employment (Germany, 1978-2016) with growth rate of total employment as independent variable

Granular residual	0.4304 **(**0.875**)**	0.7259 **(**0.776**)**	1.447 (0.626)
Granular residual (lag 1 period)		-1.4540 (0.531)	-2.8506 **(**0.267)
Granular residual (lag two periods)			2.5061 **(**0.380)
Constant	0.0249 **(**0.038)	0.01726 **(**0.135)	0.0228 (0.070)
Number of two-year periods	19	18	17
R^2	0.0009	0.0087	0.0312

Note: The numbers on the top are the estimated regression coefficient from an OLS regression and those in parentheses the probability values

From Table 3, it can be seen that the regression coefficient of the granular residual is never statistically different from zero, and the R^2-values are tiny. Therefore, there is no evidence for granularity.

In short, the regression approach, as suggested by Gabaix (2011), and the new non-parametric test, as established in this paper, lead to the same conclusion: the German economy is not a granular economy at least for the time period from 1976 to 2016.

CONCLUSION

Inspired by Gabaix's (2011) influential work and comparing what is missing in the literature, based on the evolutionary picture of profits this paper takes competition as the perspective to investigate the problem of when Gabaix's granular hypothesis holds true in general and when it fails definitely.

To accomplish this goal, we first look at the profit pictures for firms in an emerging and a maturing industry, respectively. By employing the established results on firms' profits, we then examine how competition appears in the marketplace due to constantly existing consumer surplus as caused by forever evolving consumer preference and tastes. Under the condition of existing market competition, we develop the profit pictures for new entrants and incumbent firms, respectively. With all these relevant profit scenarios well laid out, we turn our attention to the study of granularity of an industry or economy by proving 5 additional propositions based on analytical reasoning. Wherein we are able to pinpoint out when Gabaix's granular hypothesis holds true assuredly and when it does not hold true definitely.

As for the contribution, this work is different from the literature on emergence and development of an industry. Instead of looking at individual cases of success stories, and the stages and transitions between these stages that exist in the emergence and development of an industry as the literature commonly shown (for details, see the section on Literature Review), we present a general picture by looking at the evolution of profits. Traditionally, it is positive cash flow that stands for the determining factor behind the appearance of any industry. To fill a gap that exists in the huge literature on market competition - the mechanism underlying the emergence of market competition, we establish how profits and potential of profits encourage market entries and innovations. To contribute to the literature of the granularity of economies, we establish results on when the granular hypothesis holds true in general without suffering from any of the data- and anecdote-related constraints.

As for the limitation of this work, our conclusions established herein are developed by using the logical reasoning based on the following implicit assumption: All firms considered in our logical reasoning exist for the purpose of creating positive cash flows from the marketplace by selling their products, services or goods. Traditionally, this assumption is generally true for most business enterprises (Sobel, 1999). However, in recent years, it is no longer the case because some of the important business firms nowadays can successfully generate positive cash flows year after year by producing great future promises, such as some of the major e-commerce firms, where the great promises come from the fact that they place their efforts on occupying larger and large market territories (Li & Ma, 2015). This end leads to the following important theoretical and practical problems for future research: (1) If some of the firms considered in the reasonings of the previous sections are the latter kind, as described above, how would the established propositions in this paper be? And (2) there is a need to investigate the scenario as described in (1) with all firms of the latter kind.

In terms of important problems for future research, one of the issues Gabaix's (2011) granular hypothesis reveals is that macroeconomic conclusions should not be drawn by simply "averaging out" observations from individual micro-level cases. Doing so involves major leaps in reasoning from micro-level cases to macro-level abstractions and may lead to completely incorrect macroeconomic assumptions or conclusions. For example, from the existence of a few seemingly indifferent minds, we should not inductively assume that all economic agents are homogenous; from behaviors of several forward-looking thinkers, we should not inductively adopt that every decision maker thinks rationally by optimizing his/her decisions; and from the observation of a handful stably developing economies, we should not inductively believe that each economy is equilibrating. This situation of necessary avoidance in scholarly

abstraction is well illustrated in mathematics by Forrest (2013), where one version of mathematical induction is shown to produce possibly contradictory conclusions, a similar scenario as what is revealed by Gabaix's granularity.

Realizing such a challenge in inductive reasoning widely used in macroeconomics, Haldane and Turrell (2018) attempt to develop an interdisciplinary approach to macroeconomic modeling by employing techniques from other areas of learning in order to address macroeconomic questions, where the concept of wholeness, such as complexity, heterogeneity, networks, and heuristics, plays an important role. Based on the discussion in the previous paragraph, the attempt of Haldane and Turrell needs to be more general and wider reaching than it is now. In other words, there is a need to scrutinize carefully all basic assumptions and conclusions in macroeconomics that are derived by employing such a reasoning that involves a leap from micro-level cases to macro-level abstractions.

Another open question that is worthy of our attention is to develop a theoretical mechanism for the general counting of granular firms within an economy. To this end, the empirical work based on Spanish data by Blanco-Arroyo et al (2018) proposes a method to calibrate the granular size of the economy, IE, the number of granular firms. On the other hand, if we model an economy by using the systemic yoyo model (Forrest, 2019), developing such a desirable mechanism of counting might be different, if not impossible. No matter which case it will turn out to be, this is an important question to address.

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SCENARIOS NOT ADEQUATELY ADDRESSED BY ECONOMIC THEORIES

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ABSTRACT

This paper illustrates by using examples how some key and useful real-life factors are not considered in theoretical studies of economics. It explains what differences these factors will make if one or several of them are looked at. A comparison with the development of mathematics and physics suggests why it is necessary for economists to identify elementary postulates (in the language of mathematics) and laws (in the language of Newtonian physics) at the level of the four human endowments (self-awareness, imagination, conscience, and free will) as the bases for developing the rest of the theory of economics. To demonstrate the potential of this proposal, this paper develops a theorem on when a firm experiences organizational inefficiency. This work contributes to the literature by considering decision-making based on the most fundamental systems of values and beliefs of economic agents. By doing so, it will potentially help realize the goals of behavioral economics at the height of analytical analysis with greatly enhancing practical applicability.

INTRODUCTION

As the title suggests, this paper employs a few examples to illustrate how some key and useful real-life factors are not considered in theoretical studies of economics. And by comparing research of economics with those of mathematics and physics, it points to the necessity of developing economic knowledge through using logical reasoning, which is parallel to that employed in mathematics, and through originating each analysis on some elementary postulates (in the language of mathematics) and/or laws (in the language of Newtonian physics). To this end, this paper proposes to develop these elementary postulates and/or laws at the level of the four human endowments – self-awareness, imagination, conscience and free will. This idea is different of that of standard economic models, which are developed on the assumption of a *homo economicus* who is rational and selfish, has computational capability, and never mistakes (Cartwight, 2014).

Although what is proposed herein seems to be related to positive/normative economics, the two bear fundamental differences. Specifically, the latter aims to describe and address what various economic programs, scenarios and environments are and should be (Caplin & Schotter, 2008); this paper suggests a possibility to reshape the theoretical foundation of economic theories on a more manageable footing by starting all logical reasonings on the four human endowments and relevant elementary facts. By accomplishing this goal, the consequently established theory will be able to avoid the difficulty, facing normative economics, of rigorously explaining problems and issues, and the inevitable emphasis on empirical confirmations of the positive economics. The importance of avoiding the difficulty of normative economics is evident for both theoretical and practical purposes. At the same time, although empirical studies are inevitable in economic investigations, economists face the problem of erroneous thinking of the fallacy of composition when general recommendations need to be produced for decision makers based on empirical discoveries (Finocchiaro, 2015). Historically, this present work is also warranted, if we see the parallelism between the current state of economic and business studies and that when Isaac Newton developed his laws of physics. In particular, presently in the world of business, deluges of data are collected and made available for analysis; and at the time when Newton was developing his laws of motion, large amounts of data were collected, and various empirical formulas were proposed by different scholars (Lin, 2009).

If this proposal can be carried out successfully in the years to come, one can expect to improve a current situation of economic studies. In particular, the current situation can be described as follows: although a recognized business success is carefully analyzed, the established theory most likely cannot reproduce the desired economic outcomes in another business setting at a different geographical location. One good example to illustrate this end is the Industrial Revolution of England. It has been widely investigated and theorized by many scholars over the years. However, when their theories were employed in practice by many developing countries, these countries experienced failures, because the applied theories, no matter which one was adopted, did not really work (Forrest et al., 2018; Wen, 2016).

Specifically, although many human characteristics, such as personal charms and abilities, are not within the purview of economics (Pancs, 2018, p. 5), this paper uses a fictitious example to illustrate a commonly existing social phenomenon and show that when individuals' wishes are involved, some conclusions in neoclassical economics will be different. The given example demonstrates that when human desires and wishes are involved, the mainstream economics can be further enriched by logical reasonings that start on individuals' systems of values and beliefs.

In terms of the concept of rationality, it is traditionally treated as that of optimization constrained by given conditions (Wu, 2003; 2006). It is later generalized by Herbert A. Simon (Campitelli & Gobet, 2010) when he introduces the concept of bounded rationality as an alternative approach to modeling decision-making, see Hudik (2019) for very nice interpretations of rationality. Along this line of tradition, this paper proposes that each person in general is rational in his/her own sense, as defined or bounded by his/her underlying values and beliefs. When a person makes decision, he/she reasons simply by retrieving categorized values and beliefs and information in the memory (e.g., Chiou et al., 2018; Sahni, 2016;) to quickly optimize the expected potential. Corresponding to their different value-and-belief systems, individuals use their correspondingly varied methods to optimize utilities, profits, costs, risks, etc., although the stated objective functions might look the same from one economic agent to another.

This paper points out what issues exist with the analysis of the well-known prisoners' dilemma from the angle of individuals' value-and-belief systems in general and moral codes in particular. And to demonstrate how our proposed approach will work, this paper develops a theorem on when a firm experiences organizational inefficiency.

In terms of the contribution this study makes to the literature, it can be readily seen that by considering decision-making on the basis of economic agents' most fundamental systems of values and beliefs, the goals of behavioral economics (Zeiler & Teitelbaum, 2018) are naturally carried many steps forward. The agents considered here can be either individuals or firms; and for the latter case, the value-and-belief systems take the form of organizational cultures that are crystalized as companies' missions (Forrest et al., 2020' McGrath, 2013). In particular, psychological, cognitive, emotional, cultural and social factors can all be related to the natural human endowments – self-awareness, imagination, conscience and free will, on which individuals establish their systems of values and beliefs (Lin & Forrest, 2012).

The rest of this paper is organized as follows: Section 2 looks at an example that vividly demonstrates the fact that when individuals pursue their respective selfish good, they do not necessarily achieve the collective best good for all. Section 3 uses a directed, weighted network to show that even when economic agents are rational, their rationalities tend to be different from one agent to another so that consequent optimizations used in their decision-making follow different sets of criteria. Section 4 pays a revisit to the well-known prisoners' dilemma and shows that this dilemma does not exist if prisoners' systems of values and beliefs are introduced in the analysis of the game. Based on the discussions in the previous sections, Section 5 proposes to rebuild theories of economics on the basis of the four human endowments – self-awareness, imagination, conscience and free will – as some of the most basic building blocks. Section 6 concludes the presentation of this research.

ATOMICALLY MAXIMIZED UTILITIES CAN AND DO LEAD TO COLLECTIVE MISERY

To see such a situation that respective maximizations of individuals' utilities can and do produce collective misery, let us first paraphrase a fictitious scenario constructed initially by Dr. Scott W. Williams of SUNY at Buffalo over thirty years ago when he visited Auburn University, Alabama.

Three friends, named A, B, and C, did some honorable deeds. So, Genie likes to grant each of them a wish. Jumping on the opportunity, A demands that instead of the current location in a remote mountainous area, he wishes he could be living in the middle of a prosperous city center with all the wealth he will ever need in life. Bang, in a fraction of second, A now lives in the condition he wishes for.

Turning to B, Genie asks: "What wish do you like to materialize?" Looking at Genie. B answers: "I don't like to spend any additional single day of my life in this boring country out of nowhere. What I truly love is to live on a beach day after day with many beautiful women around me." Bang, as soon as having finished stating his wishes, B is now sunbathing on a beautiful beach, sipping his favorite drinks while served by many gorgeous women.

Facing C, Genie questions: "What is the wish you like me to grant you?" Without thinking much, C answers, "I really like this mountainous area. The air is always fresh, water is clean, and everything around me is green. So, my wish is that my friends A and B can live with me right here and immerse ourselves in the nature."

What happens next will be either that both A and B will be not happy or C be not happy, because their individual wishes are not consistent and cannot be compromised with each other.

If we use the terminology of utilities, we can model this fictitious scenario in terms of the utility functions U_i, $i = A, B, C$, as follows, where X_i, $i = A, B, C$, represent respectively the consumptions of these people:

$$U_A = U_A(X_A, X_B, X_C), U_B = U_B(X_B, X_A, X_C), U_C = U_C(X_C, X_A, X_B, U_A, U_B)$$

satisfying that U_A, U_B and U_C are increasing functions in X_A, X_B, and X_C, while U_C is also a convex function in U_A and U_B, respectively, so that U_C is an increasing function in U_A until a given upper bound B_A and in U_B until a given upper bound B_B, then U_C becomes a decreasing function in U_A and U_B, respectively. In this expression, the friendship is reflected in the appearance of individual consumptions in each utility function.

In this modeling, both A and B are self-centered, because their utility functions do not contain the utility of C except their own consumptions. At the same time, C treats both A and B as his friends up to a point. Specifically, after A or B or both of A and B reach certain levels of 'success' in life, C starts to feel bad and then worse. In other words, the maximization of C's utility can only be reached when the utilities of friends A and B are not more than their respective upper bounds B_A and B_B, while his diminishing utility cannot be offset by any amount of increasing consumption of goods.

Although the previous example is fictitious, it does depict a huge collection of commonly existing social phenomena in real life, where some people enjoy their respectively increasing utilities through belittling others. Beyond the existence of such people, another fundamental issue not within the purview of economics is individual differences in terms of personal charms, abilities and other human characteristics (Pancs, 2018, p. 5), most of which are dictated by people's deeply rooted systems of values; and these value systems control what is considered moral or right or wrong in life (Lin & Forrest, 2012). In mathematical terms, this end means that even with the assumption that people do make consumption decisions by maximizing their utilities, the specifically employed criteria of maximization can be totally different from one person to another.

In discussions of economics, the famous 'invisible hand' of Adam Smith (1776) originally describes merely how individuals' actions, in terms of production of goods, employment of capital and domestic industries, that are self-centered without involving any public goods can lead to unintended social benefits. However, such initial description with a well-defined scope has been interpreted over the years in various ways by many different authors in different contexts (too many works to be listed here, so they are all omitted). For example, according to Paul Samuelson's (1998), a 1970 Nobel laureate in economics, writing in 1948, this mystical principle – the existence of the invisible hand – means that when individuals pursue their respective selfish good, they collectively achieve the best good for all. The example we just discussed above clearly and undoubtedly points out the fact that this interpretation of Smith's 'invisible hand' is not correct in general. This end is exactly as what Basu (2010) states: Popularizers of economics often misrepresent conditionally true conclusions of economics in general terms with the underlying conditions ignored. Especially, what is discussed above indicates that when human desires beyond living necessities are involved, the mainstream economics can be further enriched by starting logical reasonings from the basic properties of the human systems of values and beliefs.

RATIONALITIES THAT ARE INDIVIDUALLY DIFFERENT FROM ONE ECONOMIC AGENT TO ANOTHER

To support the previous claim that even if people make consumption decisions by maximizing their utilities, the specifically employed definitions of maximization can be totally different from one person to another, let us look at the following example, constructed based on Hu (1982) and Lin (1999, p. 136).

Assume that the directed and weighted network in Figure 1 represents a production routine of a business operation. The manager likes to find the minimum path that connect node A, representing the start of the production, with node

E, the end of the production. If in his calculation the manager orders the real number weights the same way as how real numbers are conventionally ordered, then the path A → B_1 → C → D_1 → E is what the manager is looking for. The weight of this path is equal to 1. In comparison, other possible paths from node A to node E have weights 2, 3, and 4, respectively.

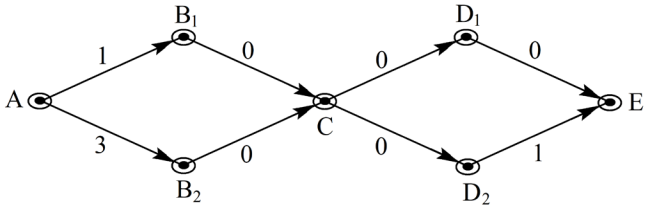

Figure 1. The concept of minimum is defined differently

However, if in the manager's set of decision criteria there is a mod4 function, that is, in his set of criteria, for any two real numbers x and y, $x < y$ if and only if $x(\mathrm{mod}4) < y(\mathrm{mod}4)$, then the path with the minimum weight is A → B_2 → C → D_2 → E. In particular, the weight of this particular path is 3 + 0 + 0 + 1 = 4 (mod 4) = 0, while other paths respectively have weights 1, 2, or 3.

Speaking differently, what this example demonstrates is that when the criteria of priority are different from one person or business situation to another, the same profit (respectively, cost) function can have totally different maximum (respectively, minimum) values due to the fact that the measurements of optimization are different. Such differences in the measurement of optimization reflects the differences in individuals' systems of value and beliefs.

When looking at a real-life economic process, the mod4 function in this example can be considered as periodicity 4, where the underlying process repeats itself periodically with period 4. In particular, if we apply this mod function on the time variable underneath an economic process, then the specific period 4 can be replaced by any positive real number r. In this case, it simply means that the economic process starts at time moment 0 and finishes at moment r, from which the process starts all over again to repeat itself. With this understanding, the timeline (or the real number line) becomes a circle of circumference r on which a point travels one loop after another starting at the origin without end in sight, Figure 2.

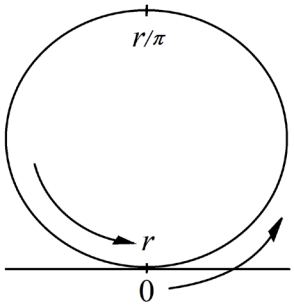

Figure 2. How mod$r$ function is modelled by a point on the circle of radius $r/2\pi$

To illustrate the concept involved in the previous discussion, let us look at school semesters of an education system. Assume that the student evaluation of every course contains a question on student learning and the effectiveness of professor's teaching. Due to differences in the value and belief systems of individual professors, each professor generally employs his/her unique approach to maximize students' learning. In other words, although each chosen optimum approach comes out of the same objective function, different personal systems of value and beliefs lead to different optimal outcomes. In this example, the length of one school semester is the period, over which professors seek for their individually unique ways to deliver their effective teaching and produce the maximal student learning.

To summarize, instead of assuming that every economic agent is rational in a universally accepted sense and makes decisions by optimizing his/her expected outcomes through using tools from a defined set of approaches (Campus, 1987), the more realistic situation is the following:

Each person has his/her own specific system of value and beliefs (Lin & Forrest, 2012). When a person makes decision, he/she optimizes the given situation by using his/her underlying individually specific criteria rooted in the person's system of value and beliefs.

To this end, one might challenge by asking: How can you explain impulsive purchase decisions, which later turn out to be against some of the underlying values or beliefs of the purchaser? Such purchases generally end up in one of two possibilities: the purchased good is returned or it is not used for the originally expected purpose. In either case, the violated values and beliefs are corrected.

More specifically, the aforementioned assumption of universally accepted rational agents implicitly means the existence of an external system of measurement, which judges whether a particular behavior is rational or the procedure of optimization is gone through universally no matter who is conducting the optimization. In the contrary, the realistic situation, as given above, assumes away any external measurement system and allows economic agents to optimize their objective functions by using their individually different sets of criteria; and these criteria are developed out of these individuals' underlying systems of value and beliefs. Because of this reason, to deal with a situation of concern, different economic agents take their individually different optimization approaches. These differences in approaches then lead to drastically different outcomes due to diversely dissimilar courses of actions taken. In short, what is considered optimal is different from one economic agent to another; and instead of being universal, the used methods of optimization are in fact also different from one decision maker to another.

In terms of the literature, the concept of rationality has been studied in many fields of knowledge, including, but not limited to, economics (e.g., Krugman & Wells, 2017), game theory (e.g., *Osborne & Rubinstein, 2001*), decision science (e.g., *Parmigiani & Inoue, 2009)*, artificial intelligence (e.g., *Russell & Norvig, 2003*), cognitive science (e.g., Varela et al., 1991), ethics (e.g., Ferrel et al., 2018) and philosophy (e.g., Bourdieu, 1998). In particular, in the context of economics, a customer is considered rational, if he/she has clear preferences, handles uncertainties by using functions of variables, and takes actions to optimize expected outcomes for him/herself from among all feasible possibilities. When such a concept of rationality is employed to develop a scholarly body of knowledge as one of the fundamental building blocks, one can readily see that the knowledge will not be adequate enough to capture a major part of the reality. It is because in real life many decisions are made under the dominating influence of psychological, cognitive, emotional, cultural and social factors. The realization of such challenge has led to the development of behavioral economics (Teitelbaum & Zeiler, 2019) in order to study the effects of psychological, cognitive, emotional, cultural and social factors on the decisions of individuals and institutions and how such decisions vary from those implied by classical economic theory (Zeiler & Teitelbaum, 2018).

Since psychological, cognitive, emotional, cultural and social factors are associated with the content in the value-and-belief system of a decision maker for these factors to be part of decision making (Lin & Forrest, 2012), we propose that each person in general is rational in his/her own sense as defined by his/her underlying values and beliefs. When a person makes decision, he/she reasons by retrieving categorized values and beliefs and information in the memory to quickly optimize the expected potential. This end has been confirmed repeatedly by scholars in the area of the categorization paradigm of the marketing research (e.g., Chiou et al., 2018; Mandler 1982; Moss, 2009; Nedungadi 1990; Sahni, 2016; Sujan 1985), and by studies of politics and the science of mind (Lakoff & Wehling, 2016). Because individuals have their own different systems of values and beliefs, the methods individuals use to optimize utilities, profits, costs, risks, etc., have to be different from one another although the stated objective function might look the same, as demonstrated by the previous example. That explains why a perfect logical reasoning in one person's standard, such as Donald Trump's handling of national and international affairs during his presidency from 2017 - 2021, can be seen as irrational in many other people's eyes.

ISSUES WITH THE ANALYSIS OF PRISONERS' DILEMMA

Before we present our suggestion on using human systems of values and beliefs as a fundamental building block of economic theories, let us first look at issues with the prisoners' dilemma (Poundstone, 1993). To make our points cross more easily, let us first outline the related details.

Two members of a gang are arrested and placed in solitary detention so that they cannot communicate with each other. Without adequate evidence to convict them on the principal charge other than a lesser charge, the prosecutors offer each gang member a bargain opportunity: betray the other by testifying the other's committing the crime or remain

silent. The associated payoffs are given below, where each negative number standards for the number of years in prison.

		B's choice	
		Stay silent	Betray
A's choice	Stay silent	-1, -1	-3, 0
	Betray	0, -3	-2, -2

The conventional study of this game assumes that the prisoners will not be rewarded or punished in any other way than what is given here. So, if the prisoners are rational, betraying the other is the only optimal choice. As a consequence, both of these prisoners serve 2 years in prison. That is worse outcome than that if they both stay silent cooperatively.

With the given assumptions, the analysis of this game is perfect. However, the very problem with this dilemma that disagrees with what often happens in real life appears with the assumptions, because in real life people make decisions by using their systems of values and beliefs instead of merely considering self-centered payoffs based on the so-called rationality. In other words, people generally do not make decisions that are against their moral codes rooted in their systems of values and beliefs even when offered with rewards. That explains why in real life, people tend to be biased towards behaving cooperatively instead of individually maximizing their own utilities without considering consequences others have to bear (Fehr & Fischbacher, 2003). Besides from the bias toward behaving cooperatively, there is also a part of conscience that could play a role in decision making because betray a close associate is generally regarded as a selfish or immoral act. On top of that, there may be a fear for revenge when the other gang member is released from the prison, which is also part of the imagination (Lin & Forrest, 2012).

Beyond what is presented above in terms of how some key real-life factors are not considered in theoretical studies of economics and business, another interesting observation is that scholars in economics commonly use such words as "believe," "should," "would," and "might." That is very different from how scientists speak in affirmative tones when they talk about their derived conclusions and established results. By comparing mathematics/physics and economics, one can readily see some major differences between the two. For example, for the former case, scholars traditionally investigate totally abstract concepts or lifeless objects, the associations among the concepts, and the operational laws underneath the evolution of physical things. They develop the consequent bodies of knowledge based on some basic postulates and the laws through logical reasoning. The magnificent success of this approach has been well confirmed by the recent scientific history and rapid development of technology of the past several hundred years. On the other hand, studies of economics do not evolve in the same way as that of mathematics and physics, as described above, due to the reason that as of this writing, those very elementary laws or postulates that are underneath mostly seen economic activities have not been identified and established.

The aforementioned differences between mathematics/physics and economics lead to quite varied practical consequences. For example, when a mathematical theorem is established, different mathematicians will be able to reestablish the result without knowing exactly how the theorem was initially proved, even though these mathematicians might experience some great difficulties to accomplish this end. Similarly, when a physical gadget is produced, other people will be able to develop gadgets with almost identical functionalities although these people do not know exactly how the initial gadget was designed and produced. On the other hand, for applications of economics theories, the situation is completely different. For example, by carefully analyzing business successes and by theorizing the reasons behind a business success, people most likely cannot reproduce the desired economic outcomes in another business setting at a different geographical location. To this end, one good example is the Industrial Revolution of England. It has been widely investigated and theorized by many scholars over the years. However, when their theories were employed in practice by many developing countries, these countries experienced failures, because the applied theories did not really work (Forrest et al., 2018; Wen, 2016).

HUMAN ENDOWMENTS AS BASIC BUILDING BLOCKS OF ECONOMIC THEORIES

Following the discussions in the previous sections, this section demonstrates how individuals' systems of values and beliefs can be theoretically employed to establish new insights of economics. It attempts to show that what we propose here will go beyond what Cartwight (2014) states about behavioral economics – it analyses the psychological

underpinnings of human economic behaviors; it will improve economics on its own term. Related to this claim, in the fields of management and organizational behaviors, the fit between person and organization (PO fit) has been widely recognized since late 1980s and early 1990s. It is defined as the similarity between the characteristics of people and corresponding characteristics of organizations (Kristof, 1996). More specific, this concept refers to the alignment or congruence between characteristics of employees (*i.e.*, personality, preferences, attributes, and perceptions) and those of organizations (*i.e.*, business strategy, values, culture, and leadership) (Chatman, 1989; Joo, 2020; Kristof, 1996).

Before we can present related details, let us look at two concepts – a firm's mission and organizational inefficiency. First, for each firm, its mission clearly spells out the firm's purpose (including its values and beliefs), what it does and what the targeted market segment it serves (McGrath, 2013). The goal of the firm is to maximize its business objective, as given in the mission statement, which might be making as much profit as possible, contributing to the wellbeing of the society as much as possible, or others. Because different people have different underlying systems of values and beliefs (Lin & Forrest, 2012), each firm that desires to succeed in the marketplace needs to have a mission (statement) to unify these individually different systems of values and beliefs (Forrest, 2018; Forrest & Orvis, 2016). Second, by organizational efficiency, it is defined (Forrest & Orvis, 2016) as such a state of a firm that all employees help their firm reach the objectives stated in the firm's mission. So, a firm is said to be (organizationally) efficient, if all employees help the firm approach or actualize the firm's mission in one way or another. Otherwise, the firm is said to be inefficient. The following theorem confirms the existence of organizational inefficiency, assuming that the criteria a focal firm employs to maximize its business objective, as clearly spelled in its mission, follow the conventional ordering of real numbers.

Theorem 1. If the value-and-belief system of a full-time employee is not in total agreement with his/her firm's mission, then the firm naturally experiences organizational inefficiency.

Proof. By contradiction, assume the opposite is true. That is, there is such a firm within which the value-and-belief system of its full-time employee k is not in total agreement with the firm's mission. Hence, there is a variable Y that measures one aspect of k's personal values and beliefs such that the utility of k increases with Y while the work efficiency of k in terms of helping realize the mission of his/her firm decreases with Y. In real life, although it is very possible that this variable Y cannot be explicitly measured or even defined, its existence is definitely unquestionable. For example, when an employee goes through his/her annual performance evaluation, written comments generally reflect the totality of those underlying implicit measures of the evaluator.

Symbolically, what are assumed here can be written as follows:

$$U_k = U_k(X_k, Y), \text{satisfying } \frac{\partial U_k}{\partial X_k} > 0 \text{ and } \frac{\partial U_k}{\partial Y} > 0, \tag{1}$$

where U_k is k's utility function and X_k stands for k's total consumption. And the objective function Obj of the firm can be respectively written as follows:

$$Obj = Obj(X_c, U_k, U_1, U_2, \dots), \text{satisfying } \frac{\partial Obj}{\partial X_c} > 0, \frac{\partial Obj}{\partial U_i} > 0, i = k, 1,2, \dots \tag{2}$$

where X_c stands for the aggregated expenditure of the firm, including the monetary expenses on all employees except k, and $U_1, U_2, \dots$ represent all other employees' utilities. Because this objective function is an increasing function in every employee's utility, the firm keeps its employees' well-being as part of its business objectives.

The monetary bonus that measures the work efficiency of k is written as follows:

$$B_k = B_k(Y), \text{satisfying } \frac{dB_k}{dY} < 0. \tag{3}$$

Once again, the existence of the variable Y might only exist implicitly and cannot be measured readily in real life. However, its negative effect on the work quality and efficiency generally can be clearly seen by other people

of the firm. Hence, for this symbolic proof, without loss of generality we assume that Y can be measured and used in determining the amount of employee k's monetary bonus.

The firm distributes its monetary resources to its employees by maximizing its objective function Obj in equation (2) subject to the budgetary constraint below:

$$X_c + X_k = X_c + (I_k + B_k), \tag{4}$$

where I_k stands for k's base salary from the firm. By maximizing the firm' objective function, equation (2), subject to the budgetary constraint, equation (4), the following appear

$$\frac{\partial X_k}{\partial Y} > 0 \text{ and } \frac{\partial X_k}{\partial Y} = \frac{\partial B_k}{\partial Y} < 0, \tag{5}$$

a contradiction. This end implies that the firm that satisfies the given conditions is organizationally efficient is incorrect. QED

According to Lin and Forrest (2012), for each person, his/her system of values and beliefs is systemically developed over time on the four human endowments – self-awareness, imagination, conscience and free will. Hence, all the discussions above points to that it will be adequate to employ human endowments as the starting postulates for us to develop theories of economics.

Note: In the proof of Theorem 1, we maximized the focal firm's objective function. Corresponding to this optimization, in economics, there is such a long-standing convention that firms' objective is to maximize their profits (Wu, 2006). In reality, however, are business firms truly place profit maximization as its primary objective? There has been a substantial debate on this issue (e.g., Hussain, 2012; Jensen, 2001). Recently, a group of powerful US chief executives abandoned the idea that companies must maximize profits for shareholders above all else (https://opportunity.businessroundtable.org/ourcommitment/, accessed on January 30, 2021). "Americans deserve an economy that allows each person to succeed through hard work and creativity and to lead to a life of meaning and dignity" and "we commit to deliver value to all of them, for the future success of our companies, our communities, and our country," said the statement from the organization (https://s3.amazonaws.com/brt.org/BRT-StatementonthePurposeofaCorporationOctober2020.pdf, accessed on January 30, 2021), chaired by JP Morgan Chase CEO Jamie Dimon.

The reason why many managers and executives don't put profit maximization as the number one priority can be explained by the four human endowments – self-awareness, imagination, conscience and free will. In particular, the conscience of these decision makers makes them want to contribute more to their respective communities, such as donations and offering various kinds of necessary supports to their communities. This end also supports the notion that how an individual behaves is dictated by his/her value-and-belief system

CONCLUSIONS

This paper examines examples on how the mainstream economics can be enriched if (1) personal wishes are considered as one of the decision-making criteria, or (2) rationality is seen as respectively bounded by individuals' value-and-belief systems; or (3) moral codes are treated as the foundation behind decision making and the taking of particular actions. By summarizing the analyses of these examples, this paper proposes that each person in general is rational in his/her own sense, as defined and bounded by his/her underlying values and beliefs. When a person makes decision, he/she reasons simply by retrieving categorized values, beliefs and information in the memory (e.g., Chiou et al., 2018; Sahni, 2016) to quickly determine the optimal expected potential. What is particularly important is that corresponding to their different value-and-belief systems, individuals use their correspondingly varied methods to optimize utilities, profits, costs, risks, etc., although the stated objective functions might look the same from one economic agent to another. Speaking differently, the mainstream economics implicitly assumes the existence of an external reference frame, which dictates what is considered rational and how optimization is carried out. Contrary to this assumption, this paper suggests that the real-life situation is the following: instead of the existence of such an external reference frame, each decision-making entity is its own reference frame that determines the meanings of rationality and optimality and the consequent method of optimization.

Because each person's system of values and beliefs is determined by the contents of his/her particular endowments – self-awareness, imagination, conscience and free will (Lin & Forrest, 2012), this paper proposes to identify elementary postulates (if speaking in the language of mathematics) and/or laws (if speaking in the language of Newtonian physics) at the level of these endowments. On the bases of these postulates and laws, the entire edifice of economics will be constructed in such a way that each time when a new concept is introduced, relevant results and knowledge will be established by logical reasoning that traces back to some of the postulates and laws. By doing so, many of the inconsistent results, developed by different scholars over time, such as those in the studies of the Industrial Revolution (e.g., Rostow, 1960), and many endless and emotional debates, where debaters generally base their arguments on some empirical conclusions (e.g., Andreoni & Chang, 2019), can be affirmatively settled.

As for potential future works along the line developed in this paper, one can first identify the aforementioned postulates and laws. And then, similarly to how Theorem 1 is established, all other known theorems of economics can be reformulated on the bases of the identified postulates and laws. Doing so will inevitably help uncover new results. By referencing to the magnificent successes of mathematics and physics, one can expect that the economics knowledge established in the fashion just described here will possess a much wider range of practical applications.

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STUDENT-ATHLETES DRIVE ENGAGEMENT FOR BUSINESSES IN NIL PARTNERSHIPS

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ABSTRACT

Collegiate athletic departments, student-athletes, and businesses are all trying to navigate recently changing NCAA legislation governing name, image, and likeness (NIL) rights. This changing landscape is allowing student-athlete endorsers to play an important role from the perspective of brand building for local, regional, and national companies. This study examines the initial explosion in NIL deals for student-athletes and the relationship between student-athlete endorsers and sponsoring companies. An analysis of the social media activities of both parties was conducted and the initial findings suggest businesses are benefiting from the NIL relationship with the student-athlete.

INTRODUCTION

On June 30, 2021, the concept of amateurism for collegiate athletics changed forever when the National Collegiate Athletic Association's (NCAA) Division I Board of Directors approved an interim policy allowing student-athletes to be compensated for their name, image and likeness (NCAA, 2021). The interim name, image and likeness (NIL) policy, which went into effect on July 1, 2021, allows student-athletes at all three levels of the NCAA to earn compensation outside of the financial aid structure established by NCAA legislation. This change not only has an impact on student athletes but provides an opportunity for businesses to establish partnerships through endorsement or brand ambassador relationships.

Several marketing theories suggest student-athletes will make effective endorsers and brand ambassadors. Research has found the effectiveness of professional athletes and social media influencers serving in these roles. NCAA student-athletes expand the options advertisers can hire to serve as endorsers or brand ambassadors moving forward.

LITERATURE REVIEW

Social Identity Theory

According to Boyle and Magnuson (2007), people examine themselves by looking at the combination of their personality traits and the facets of their social experiences. The facets of his or her social experiences can also be called the individual's social identity (Tajfel & Turner, 1986). Social identity theory concludes that an individual is defined by the affiliations he or she has with other external groups (e.g., political, ethnic, professional). The individual has an understanding that he or she is a member of particular social groups (Dietz-Uhler & Murrell, 1999). The involvement in the social group is dependent on the individual's emotional attachment to the group and the value he or she places on the membership in the group (Hickman et al., 2005).

An individual's social identification within a group serves two functions for the person (Hickman et al., 2005). First, the individual's identification with social groups helps lessen insecurity about the social environment and directs the actions of the individual in his or her interactions with others. The second function of social identity is the enhancement of an individual's self-esteem. Events that positively impact a group serve as esteem boosters for members. An example of this type of event would be if the individual's favorite sports team won a championship. If the individual socially identifies with the team, he or she will have higher self-esteem following the achievement.

Source Credibility Model

The source credibility model identifies that the effectiveness of a message depends on the level of expertise and trustworthiness of an endorser (Hovland & Weiss, 1951). Studies show that if an endorser shows trustworthiness to the product, it's very likely that the consumer will purchase the product (Sternthal et al., 1978). Their trustworthiness and credibility begin when the endorser steps into the public eye. Credibility has a positive effect on

the persuasiveness of a message, making a significant impact on the value of endorsements from perceived credible sources (Harmon and Kenneth, 1982).

Attractiveness Model

The attractiveness model suggests that any celebrity or athlete who is attractive contributes to persuasive communication to branding or selling different products as an endorser (McGuire, 1985; Roy & Jain, 2016). The attractiveness model highlights the appearance of the endorser, but this model also links with similarities, familiarities, and likability of the endorser to the effectiveness of the message they're trying to get across to the consumer. The attractiveness model is huge to the successes of not only the product but also for the endorser selling that specific product.

Meaning Transfer Model

The meaning transfer model suggests that celebrity endorsers add their own symbolic meaning to the endorsement process (McCracken, 1986; Peetz et al., 2004; Roy & Jain, 2016). It also incorporates additional elements including their culture, status, and lifestyle. Advertisers tap into these additional elements to enhance the pairings of endorser and product. This cohesion increases the message impact on the consumers.

Product Match-Up Hypothesis

The Match-Up Hypothesis states that a degree of congruence between the source and the receiver of a message positively affects the effectiveness of communication (Kournig & Boyd, 2009). The physical attractiveness of the endorser does not significantly impact the effectiveness of the message unless the endorser's attitude towards the product and the communication align with the image of the endorser. A lack of alignment lessens the impact identified in the attractiveness model.

Endorsers and Brand Ambassadors

A brand ambassador or corporate ambassador is a person who is hired to help to increase brand awareness and sales for a company (Ambroise et al., 2014). A company's brand can be defined as a "name, term, design, symbol, or any other feature that identifies on seller's goods or service as distinct from those of other sellers" (Definitions, 2021). However, according to Jacobs (2003), a brand is not merely a company logo or tagline, but rather the company's promise about what the brand offers. The internal branding process is to let employees "live the brand" (Gotsi & Wilson, 2001; Burmann & Zeplin, 2005).

A brand ambassador is someone who is passionate about an organization or its brand, and engages in activities, often on social media, that provide brand meaning for consumers (Ambroise et al., 2014). Brand ambassadorship has expanded through social media technology because social media platforms enable the transmission of broadcast monologues to social dialogues (Botha & Mills, 2012). Typically, brand ambassadorship is considered a function of word-of-mouth marketing (Groeger & Buttle, 2014).

Name, Image, and Likeness Legislation

In the summer of 2009, former UCLA Bruin basketball player Ed O'Bannon brought a lawsuit against the NCAA, Electronic Arts and Collegiate Licensing Company over the use of NCAA student-athletes' images in video games, DVDs, photographs and other material (Jon Solomon, Jun 6, 2015). O'Bannon's legal action started an undercurrent of pressure against the NCAA regarding student athlete welfare and compensation. Growing pressure led to the NCAA's consideration of name, image and likeness legislation in late 2019 (NCAA, 2021).

The initial recommendation called for modernizing name, image and likeness rules for student-athletes. When approved by the NCAA membership, these rules would allow: Compensation for third-party endorsements related to athletics, without school or conference involvement. Compensation for other student-athlete opportunities, such as social media, new businesses, and personal appearances, without institutional involvement or the use of trademarks/logos. The board emphasized that at no point should a school pay student-athletes for name, image and likeness activities. The Board of Governors directed each division to create rules using the principles and guidelines

it approved in October 2019 and the recommendations it approved April 28, 2020 (NCAA, 2021). On June 30, 2021, NCAA's Division I Board of Directors approved the interim policy. The interim name, image and likeness (NIL) policy, which went into effect on July 1, 2021, allows student-athletes at all three levels of the NCAA to earn compensation outside of the financial aid structure established by NCAA legislation. The NCAA is continuing to work on a national law that will assist colleges and universities, student-athletes and their families better traverse the NIL landscape. Until federal legislation or new NCAA legislation is created, states have the burden of enacting laws that govern NIL.

At the time of publication (December 2021), twenty-eight states have passed laws governing name, image and likeness for student-athletes (ESPN, 2021). Three additional states have bills actively moving through the legislative process. State legislation started in California, when the California SB 206 "Fair Pay for Play" Act was passed in September 2019. This act prohibits the NCAA and member institutions to punish student athletes for accepting endorsement deals. The Act grants the college athletes a right to make a profit off of their identities. The Act also allows them to hire agents and other representatives to help them in this process, whether that be helping them find deals or helping them negotiate deals.

NIL Impact on Student-Athletes

The NCAA made the claim that student-athletes would have no NIL value in their argument against NIL deals. In a study done earlier this year, it was found that the NCAA's claim was false (Kunkel et al., 2021). They researched Division I athletes and their social media pages. The findings illustrate student-athletes can provide value as endorsers and ambassadors. The researchers broke it down by each site using Instagram and Twitter. Applying influencer marketing industry standard rates, their findings demonstrated legitimate value for student-athletes leveraging their social media followership. They also found that NIL impact is not consistent and will vary based on the institution the athlete attends. However, while it does impact the NIL value, the institution does not create the value. That aspect will always be with the athlete. Almost immediately after the NIL legislation went in place, companies started signing NCAA student-athletes to brand ambassador partnerships.

METHODOLOGY

The purpose of this study was to examine name, image and likeness partnerships between student-athletes and car dealerships. Additionally, descriptive statistics on social media followership and social media engagement for both parties were collected and analyzed.

Partnerships were identified through two methods. The web search research (WSR) approach utilized search engines and tested the keywords NIL, car dealership, and student-athletes. To expand the data set, Instagram and Twitter accounts of NCAA Division I college football players at top ten ranked institutions were examined. The week 5 AFCA Coaches Poll rankings were used.

Once partnerships were identified, researchers collected followership counts for both parties, identified Instagram posts and tweets on the student-athletes' profiles, and collected social media engagement data for these posts. Social media engagement data included likes, retweets and comments for Twitter posts and likes and comments for Instagram posts. Additional information about compensation was also collected when available. Simple descriptive statistical analysis was conducted to provide quantitative analysis for the study.

RESULTS

In total, twenty partnerships were identified and analyzed. Nearly all of the partnerships analyzed were for football players (n=19). Eighteen of the student-athletes were compensated with automobile lease or ownership stipends. Cash payments were used in 10% (n=2) of the partnerships as a means of compensation. The automobiles made available to the student-athletes ranged in value from $40K to $95K MSRP. The automobiles included trucks, SUVs, and sports cars from a variety of manufacturers.

Twitter accounts and activities for both parties were analyzed. Student-athlete account follower counts ranged from 31 followers to 72,000 followers with a mean of 19,750.75 (s=18,033.38). Dealership account follower counts ranged from 0 followers to 4,187 followers with a mean of 386.55 (s=934-78). 40% of the student-athletes (n=8) tweeted

about their partnership with a dealership. The social media engagement results for Twitter likes ranged from 19 likes to 2,561 likes, with a mean of 866.75 (s=865.50). Retweets carried a mean of 94.88 (s=112.27) and Twitter comments had a mean of 24.38 (s=29.01).

Instagram accounts and activities for both parties were also analyzed. Student-athlete account follower counts ranged from 6,316 followers to 387,000 followers with a mean of 62,556 (s=90,017.68). Dealership account follower counts ranged from 0 followers to 66,500 followers with a mean of 8,138 (s=14,995.03). 40% of the student-athletes (*n*=8) posted about their partnership with a dealership. The social media engagement results for Instagram likes ranged from 754 likes to 40,904 likes, with a mean of 7,967 (s=13420.39). Instagram comments ranged from 0 comments to 124 comments and had a mean of 63 (s=43.45). Twenty-five percent (*n*=5) of the student-athletes posted on both Twitter and Instagram. Three unique student-athletes posted on either Instagram or Twitter, with 45% (*n*=9) of the student-athletes having no mentions of the partnership or car dealership on their Instagram or Twitter accounts.

DISCUSSION

Car dealerships have placed value in establishing these relationships given the compensation offered to student-athletes in these partnerships. A simple descriptive statistical analysis demonstrates differences in the impact of social media efforts between student-athletes and partnered car dealerships. Followership counts provide some insight in the motivation for car dealerships to partner with student-athletes. In only two partnerships for Twitter and one partnership for Instagram does the car dealership have a stronger social media following than the student-athlete.

The results also suggest that social media posts were not a requirement of the partnership, which caught the researchers off guard. On both social media platforms, less than half of the student-athletes announced or promoted the partnership to their followers. This calls into question the motivation for car dealerships to enter these partnerships. Given the size differential of follower counts and the perceived value of car dealerships leveraging the social media accounts of student-athletes, it would make sense to require social media posts as part of the partnership agreement.

CONCLUSION

The results of this study leave more questions than answers, especially regarding the social media activities, or lack thereof, by the student-athletes. This limitation could be due to the small sample size or the infancy of this business practice. Kunkel and colleagues (2021) demonstrated student-athlete value by applying standard marketing influencer rates to student-athlete account followership counts. Car dealerships should be able to capitalize on this perceived value by including social media activity as part of the endorsement agreements. The researchers question whether these partnerships are built on traditional marketing principles or if the motivation is influenced by other practices, namely car dealerships serving as athletic department boosters. The differences in followership counts between both parties suggest businesses entering these agreements should require consistent social media messaging from the student-athlete.

The timing of the study also serves as a limitation when considering the infancy of NIL legislation and the underdeveloped market for student-athlete endorsements. There is little empirical evidence supporting the effectiveness of student-athletes serving in brand ambassador or endorser roles for companies. The timing of the study also narrowed the scope of student-athlete partnerships examined. Since the initial data collection, a shift in the market has occurred as winter student-athletes, namely men's and women's basketball players, have started to receive more NIL partnerships. This trend should continue, and a growing number of spring student-athletes will receive attention as their season approaches over the next few months.

Moving forward, it will be important to examine the impact of these partnerships past student-athlete seasons and careers. As mentioned, if the motivation for entering these relationships is more to serve as boosters rather than businesses seeking a return on investment, how will common occurrences in collegiate athletics impact these relationships. Specifically, what will happen when student-athletes get injured, exhaust eligibility, lose their role through performance or off-field incidents, or enter the transfer portal. The lack of research in this area, given the newness, leaves a lot of questions unanswered.

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DIVIDEND POLICY FOR FIRMS WITH NEGATIVE BOOK VALUE OF EQUITY

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ABSTRACT

This paper investigates whether negative book equity firms have a dividend policy and whetherthat dividend policy is different from positive book equity firms. In most prior studies of dividendpolicy, firms with negative book equity (NBE) are specifically excluded from the data sample. NBE firms have been perceived to be financially distressed and insignificant. However, recent studies of NBE firms by Jan and Ou (2012), Ang (2015), and Luo, Liu, and Tripathy (2021) find evidence that the percentage and frequency of NBE firms is increasing, and a portion of NBE firmsare financially and operationally healthy, which suggests that some NBE firms potentially have adividend policy.

Based on analysis of the summary statistics and logit regressions, this investigation of the2020 NBE dividend paying firms indicates that the negative book equity (NBE) dividend payers have the *same* firm characteristics as positive book equity (PBE) dividend paying firms. This studyshows that the 2020 NBE dividend payers are larger, more profitable, older, and have higher earnedcapital - identical to the prior research of positive book equity (PBE) dividend payers. Moreover, logit regression analysis of NBE dividend growing firms indicates that the *same* characteristics [larger market equity size, higher profitability, and lower volatility] that increase the probability of being a PBE dividend growing firm also increase the probability of an NBE dividend paying firm growing the dividend in 2020.

INTRODUCTION

In many of the most seminal investigations of dividend policy[1], firms with negative book equity (NBE) are specifically excluded from the data sample. Several very good reasons often lead researchers to omit the NBE firms from empirical studies. Historically the number and marketcapitalization of NBE firms seems to be a small and insignificant (or rare) part of the overall sample of firms (Fama and French, 1993). In addition, NBE firms are perceived to be financially distressed and expected to fail. Finally, and perhaps most importantly, the presence of negative book equity firms in large, cross-sectional data sets complicates the calculation and economic interpretation of common financial ratios such as market-to-book ratio (M/B), return on equity (ROE), and total equity-to-total capital ratio (TE/TA).

Recent studies indicate that these negative book equity (NBE) firms are becoming harder to omit from empirical data sets. Jan and Ou (2012), Ang (2015), and Luo, Liu, and Tripathy (2021)all find evidence that the percentage and frequency of NBE firms is increasing over time. Clearlythe incidence of some of the largest market capitalization companies in the investment universe (including well-known, brand-name companies such as McDonalds, Starbucks, and Boeing) as negative book equity firms in 2020, indicates that NBE firms are no longer small and insignificantin the data sample. Furthermore, Ang (2015) and Luo, Liu, and Tripathy (2021) show evidence that NBE firms exhibit heterogeneous characteristics. They show that at least a portion of NBE firms are financially and operationally sound. Jan and Ou (2012) and Ang (2015) document that many U.S. corporations report negative book equity but survive for many years. Given these findings show some NBE firms survive many years, and a portion of NBE firms are financially aswell as operationally healthy, it suggests that some NBE firms may have a dividend policy.

This study examines the dividend policy of negative book equity (NBE) firms in 2020 and investigates whether the factors that influence the dividend policy of negative book equity (NBE)firms are different than the factors that motivate the dividend policy of positive book equity (PBE)firms. While I continue to follow the current NBE literature researching the heterogenouscharacteristics amongst NBE firms, I focus on dividend policy rather than topics related to financial distress. This paper extends the expansive literature on dividend policy in the following ways. I believe that this is the first study to specifically investigate the dividend policy of firms with negative book equity, as these firms are typically omitted from typical empirical research ofpositive book equity firms. Furthermore, I extend the examination of dividend policy of NBE firmsto the economically significant issue of dividend growth, which impacts firm market value (Damodaran, 2006).

This study provides evidence confirming the recent NBE literature that a portion of 2020 NBEfirms, especially NBE dividend payers and dividend growers, are financially and operationally strong, and not in financial distress. For example, about 95% of the 2020 NBE dividend growershave been profitable over the past 10 years, and about 50% of the 2020 NBE dividend growers arerated investment-grade. The investigation finds that the prior literature of NBE firms classified aslarge negative book equity (LNBE) firms by Ang (2015) and healthy negative book equity (HNBE)

firms by Luo, Liu, and Tripathy (2021) with sound financials have a higher percentage of dividendpayers and dividend growers than other negative book equity firms that are considered financiallydistressed.

Most importantly, this investigation of the 2020 NBE dividend paying firms indicates that thenegative book equity (NBE) dividend paying firms have the *same* characteristics as positive bookequity (PBE) dividend paying firms reported in the dividend policy literature. This paper shows that the 2020 NBE dividend payers are larger, more profitable, older, and with higher earned capital - identical to the prior research of (PBE) dividend payers.

Based on analysis of the summary statistics and logit regressions, the 2020 NBE dividend payers are much larger in asset size and market capitalization compared to NBE non-payers, and increasing size significantly increases the probability that a 2020 NBE firm pays a dividend. The 2020 NBE dividend payers are much more profitable than NBE non-payers. Furthermore, the 2020NBE dividend payers have profitability similar to the profitability of PBE dividend payers reportedin the literature. Increasing profitability significantly increases the probability that a 2020 NBE firm pays a dividend, just as increasing profitability increases the likelihood that a PBE firm paysa dividend. The 2020 NBE dividend payers have lower asset growth rates than the NBE non-payersconsistent with the life-cycle model researched by DeAngelo, DeAngelo, and Stulz (2006) with PBE firms. Also, the 2020 NBE dividend payers have a greater median age than the NBE non- payers, which again is consistent with the maturity hypothesis literature for PBE dividend payers.In the same manner as PBE dividend payers, I report that the earned capital median RE/TA of the2020 NBE dividend payers is larger than NBE non-payers, and logit regressions show that a largerRE/TA increases the probability that a 2020 NBE firm pays a dividend. However, the median RE/TA of NBE dividend payers is *negative* and consequently much lower than the past literature on PBE dividend payers. The fact the 2020 NBE dividend payers have a negative median RE/TApresents a considerable quandary incorporating NBE firms in data sets with PBE firms for dividendpolicy research when the RE/TA variable is to be investigated. The negative median RE/TA for the 2020 NBE dividend payers seems to arise due to accounting practices for share repurchases.

Analysis of the 2020 NBE dividend growers shows this subset to be the most financially and operationally healthy NBE firms. The fact that dividend growers even exist amongst NBE firms may seem surprising given the prior perceptions of all NBE firms as distressed. In DeAngelo andDeAngelo's (1990) study of distressed firms, they report that "almost all [*of the distressed*] samplefirms reduced dividends". However, descriptive statistics of the 2020 NBE dividend growers showthe same firm characteristics as PBE dividend growers – larger market capitalization, better creditquality, higher profitability with lower volatility, and higher growth rates. The 2020 NBE dividendgrowers are *much larger* in market equity than any other type of NBE firms. The 2020 NBE dividend growers have much better credit quality than other NBE dividend payers - higher interestcoverage, higher total debt coverage, and a higher percentage of investment-grade ratings. The interest coverage and total debt coverage ratios of the NBE dividend growers are similar to interestcoverage and total debt coverage ratios of PBE dividend growers. The NBE dividend growing firms are the most profitable category of NBE firms examined and achieve the higher levels of profitability with lower earnings volatility than other NBE dividend payers. These high levels of profitability with lower earnings volatility with the NBE dividend growers are in accordance withthe results of Hauser and Thornton (2015) who find that PBE dividend growers also attain higherhigh levels of profitability with lower risk. The logit regression analysis of NBE dividend growingfirms confirms that the *same* reported characteristics of larger market equity size, higher profitability, and lower volatility that increase the probability of being a PBE dividend growing firm (Hauser & Thornton, 2015b) also increase the probability of an NBE dividend paying firm growing the dividend in 2020.

Finally, a robustness test of the matched sample of PBE dividend payers confirms these conclusions. Although the 2020 NBE dividend payers (growers) and the matched PBE dividend payers (growers) have opposite signed equity capital ratios, the parameters that motivate dividendpolicy and dividend growth are the same for NBE and PBE firms.

[1] For example, DeAngelo, DeAngelo, and Stulz (2006)

LITERATURE REVIEW OF NEGATIVE BOOK EQUITY FIRMS

Until recently, relatively little attention in the accounting and finance literature has been givento the existence of negative book equity firms[2]. In fact, companies with negative book equity are excluded from many research studies. In the literature, NBE firms are described as small in termsof market capitalization and rare (Fama and French 1993). Bartov and Kim (2004) and Li and Lajbcygier (2007) indicate that part of the reason for excluding NBE firms is the lack ofinterpretation and economic meaning of negative book equity and the computational issues with common financial ratios such as market-to-book ratio (M/B), return on equity (ROE), and total equity-to-total capital ratio (TE/TA). Furthermore, NBE firms are perceived as financially distressed, have persistent negative earnings, and are expected to fail (Fama and French, 1992; Dichev, 1998).

However, Li and Lajbeygier (2007) make the argument that exclusion of NBE firms may resultin weakening modeling representativeness and sample selection bias; consequently, Li andLajbeygier (2007) and Brown, Lajbcygier, and Li (2008) develop methodology for inclusion of NBE firms in asset pricing factor models. Besides the need for examination of NBE firms rather than exclusion, Jan and Ou (2012), Ang (2015), and Luo, Liu, and Tripathy (2021) correct anothermisperception and find evidence that the percentage and frequency of negative book equity firmsis increasing over time. Jan and Ou (2012) report that the frequency of NBE firms increases from5% (1976 -1985) to 15% (1996-2005) with Compustat firms, excluding financials and utilities. Furthermore, Jan and Ou (2012) dispel the stereotype that NBE firms quickly fail. On the contrary,they find that a majority of NBE firms survive a long time and continue to report negative book value for several years, and some practitioners even claim that such surviving NBE firmsoutperform the market[3]. Jan and Ou (2012) search for explanations for the negative book equity phenomena and find that accumulated R&D expenses contributes to the increasing trend of negative book equity frequency.

While Jan and Ou (2012) investigate explanations for the negative book equity occurrences, Ang (2015), and Luo, Liu, and Tripathy (2021) extend the research to show that at least a portionof the NBE firms are not in financial distress. Ang (2015) reveals the heterogenous characteristicsamong NBE firms by examining firms with different magnitudes of negative book equity. Ang (2015) sorts NBE firms into four quartiles and refers to NBE firms in the quartile with the largestmagnitude of negative book equity as large negative book equity (LNBE) firms. The investigationof the sorted quartiles finds that the LNBE firms have lower distress risk and failure rate than NBEfirms in the quartile of the smallest magnitude of negative book equity. Ang (2015) reports that the negative book equity firms in the quartile of the smallest magnitude of book equity firms sufferpersistent negative earnings and financial distress. Luo, Liu, and Tripathy (2021) also examine the divergent characteristics among NBE firms but use a two-way sorting method based on both the Altman's (1968) Z-score and Tobin's (1969) q to filter healthy NBE firms from unhealthy ones. Luo, Liu, and Tripathy (2021) classify NBE firms with the highest Z-scores and medium to high Tobin's q as healthy negative book equity (HNBE) firms. These HNBE firms have superior operating performance and financial healthiness compared to the remaining other negative book equity ONBE firms. Pertinent to this paper, Luo, Liu, and Tripathy (2021) find that HNBE firms pay more dividends than ONBE firms. The revelation that any NBE firms would pay dividends seems to add to Black's (1976) dividend "puzzle", especially if all NBE firms are perceived to befinancially distressed.

[2] Deep into Negative Territory: Who Negative Book Equity Stocks Are and Their Risk-Return Implications –Auckland Center for Financial Research https://acfr.aut.ac.nz/__data/assets/pdf_file/0003/3 0000/403278.pdf[3] Negative Equity, Veiled Value, and the Erosion of Price-to-Book – O'Shaughnessy Asset Management https://www.osam.com/pdfs/research/44_Negative_ Equity_Veiled_Value_and_the_Erosion_of_Price-toBook-April-30-2018.pdf

The fact that some NBE firms survive many years and are financially as well as operationallyhealthy, suggests that some NBE firms may have a dividend policy. Based on the research of Ang(2015) and Luo, Liu, and Tripathy (2021), LNBE and HNBE firms may be aspirant dividend payers. This study extends the investigation of NBE firms with healthy financial conditions and examines the dividend policy of NBE firms. The investigation focuses on whether the factors thatinfluence the dividend policy of NBE firms are different than the factors that motivate the dividendpolicy of positive book equity (PBE) firms.

DATA AND METHODOLOGY

Data sample and Methodology

The data sample consists of all U.S. firms listed on the NYSE and NASDAQ that report negative book equity in 2020. This contrasts with most dividend policy studies that exclude firmswith negative book equity. Consistent with the prior dividend literature, financial companies, utilities, REITs, MLPs, SPACs, and ADRs are excluded from the sample. Firms with missing bookequity, accounting data, and dividend data are omitted from the sample. Following Ang (2015), I define firms with negative book equity as firms whose book value of common equity is negative.After imposing these restrictions, the sample consists of 187 NBE firms in 2020.

Following the methodology of Ang (2015), the 2020 NBE firms are sorted and classified as large negative book equity (LNBE) firms or secondary negative book equity (SNBE) firms. Next,following the method of Luo, Liu, and Tripathy (2021), the NBE firms are sorted and classified ashealthy negative book equity (HNBE) firms or ONBE firms. For examination of dividend policy,the 2020 NBE firms are sorted into dividend payers and non-payers. Finally, the 2020 NBE dividend payers are separated into dividend growers and dividend cutters. Non-parametric Mann-Whitney-Wilcoxon tests evaluate the significance of the difference in medians. Following Fama and French (2001), I investigate the firm characteristics that differentiate firms that pay dividendsfrom those that do not – size, profitability, and investment (growth). Since DeAngelo, DeAngelo,and Stulz (2006) find that the earned capital ratio is significantly related to the propensity to pay dividends, I also examine the earned capital ratio. Appendix A lists the relevant study variables and the variable definitions.

In addition to the summary statistics tests on the difference in medians between dividend payers and nonpayers, logit regressions are used to investigate the firm characteristics of dividendpayers and dividend growers. Finally, I follow the method of Ang (2015) and perform robustnessanalysis by matching NBE dividend payers with PBE dividend payers on the basis of market valueof equity.

Summary statistics for 2020 large negative book equity (LNBE) Firms

In this section, I report the findings of the empirical analysis and descriptive statistics of the 2020 LNBE firms. Following the methodology of Ang (2015), the 2020 negative book equity (NBE) firms are sorted by the magnitude (absolute value) of the book value of common equity. The firms in the top quartile with the largest magnitude of negative book equity are defined as LNBE firms as per Ang (2015). In this context of sorting the 2020 NBE firms by the magnitude of the book value of common equity, all other NBE firms smaller (in magnitude) than the top quartile are considered as secondary negative book equity (SNBE)[4] firms. Table 1 presents the summary statistics for the 2020 LNBE firms compared the 2020 SNBE firms.

Based on the sorting procedure, it follows that 2020 LNBE firms are larger in size than SNBEfirms based on median total assets and median market value of equity. Although somewhat more levered in terms of the book leverage, TL/TA, LNBE firms have better credit quality – higher median Altman Z-score, higher median interest coverage, higher median total debt coverage, anda higher percentage of investment-grade rated firms. LNBE firms are more profitable by median EBIT/TA and median ROA with lower earnings volatility. At the median, LNBE firms have more long-term assets, but less cash. SNBE firms have higher median asset growth rates, while LNBE firms have a higher median age. Interestingly, there is no statistical difference in median market valuation between LNBE and SNBE firms, using q, (Enterprise Value) EV/Sales, or (Market Valueof Equity) ME/TA. The HNBE firms defined by Luo, Liu, and Tripathy (2021) are not systematically the same firms as the LNBE firms defined by Ang (2015). Consequently, it seems that the LNBE and HNBE firm classifications describe the portion of NBE firms that are fiscally sound in a different manner.

With regards to dividend policy, a significantly higher percentage of 2019 and 2020 dividendpayers are categorized as LNBE firms. Likewise, the LNBE firms have a higher proportion of corporations that increased their dividend in 2020 than SNBE firms. In general, the 2020 LNBE firms have the traditional Fama-French (2001) characteristics of positive book equity (PBE) dividend payers – larger size, more profitable, lower growth rate (investment opportunities), and higher age.

Summary Statistics for 2020 healthy, negative book equity (HNBE) Firms

Next, I examine the descriptive statistics for the 2020 HNBE firms. Using the method of Luo,Liu, and Tripathy (2021), NBE firms are sorted by Tobin's q and Altman Z-score, with firms having high values of q and Z-score labeled as HNBE firms. The remaining firms with lower values of q and Z-score are labeled as other negative book equity (ONBE) firms. Table 2 displaysthe summary statistics for the 2020 HNBE firms compared the 2020 ONBE firms.

The 2020 HNBE firms have a higher median market value of equity compared to ONBE firms;however, the median total assets and median book equity of HNBE firms are not statistically significant from ONBE firms. HNBE firms have higher credit quality since HNBE firms are sortedby Z-score. At essentially the same book TL/TA leverage, HNBE firms have higher median interest coverage, higher median total debt coverage, and a higher percentage of investment-graderated firms.

[4] Note that Ang (2015) uses the definition of SNBE firms as only the smallest quartile of NBE firms sorted by the magnitude ofthe book value of common equity. Since I use all firms other than the largest quartile for analysis, I refer to these other quartilesas secondary.

Table 1 Summary Statistics for 2020 Large Negative Book Equity (LNBE) Firms

Variables	Secondary NBE Firms	Large NBE Firms	Z (t) statistic for difference in medians (percentage)
Size			
Median Total Assets ($)	289,000,000	5,850,000,000	-7.948 ***
Median Total Common Equity ($)	-80,800,000	-1,270,000,000	10.247 ***
Median Market Value of Equity ($)	462,000,000	7,150,000,000	-6.969 ***
Credit			
Median Altman's Z-score	0.1863	1.5067	-2.532 **
Median EBIT / Interest Expense	-0.5855	1.7459	-4.268 ***
Median EBIT / Total Liabilities	-0.0537	0.0451	-5.142 ***
Median Total Liabilities / Total Assets	1.2365	1.3161	-1.962 **
Profitability			
Median 2019 EBIT / Total Assets	-6.7%	7.9%	-5.301 ***
Median 2020 EBIT / Total Assets	-3.8%	9.4%	-5.432 ***
Median standard deviation of EBIT / Total Assets	5.6%	3.3%	3.47 ***
Median 2020 ROA	-17.2%	1.3%	-4.398 ***
Median Average ROA	-12.7%	2.2%	-5.108 ***
Median 2020 ROA minus Average ROA	-4.7%	-2.8%	-1.361
Assets			
Median Working Capital / Total Assets	0.1016	0.0771	1.043
Median Property, plant, equipment / Total Assets	0.0997	0.142	-1.682 *
Median Intangible Assets /Total Assets	0.067	0.2405	-3.749 ***
Median Cash / Total Assets	0.2121	0.1273	1.959 *
Median Sales / Total Assets	0.5207	0.716	-1.265
Median Total Asset growth rate	13.9%	5.6%	2.255 **
Capital			
Median Total Common Equity / Total Assets	-0.2729	-0.3341	1.193
Median Retained Earnings / Total Assets	-1.0694	-0.4018	-3.778 ***
Valuation			
Median Tobin's q	2.6082	2.2112	0.716
Median Enterprise Value/ Revenue	14.555	14.1	0.082
Median Market Value of Equity / Total Liabilities	1.3818	0.8505	1.458
Age			
Median Age from Incorporation (years)	17	35	-3.477 ***
Percentages			
Percentage of 2019 Dividend Payers	15.0%	42.6%	-3.49 ***
Percentage of 2020 Dividend Payers	11.4%	46.8%	-4.515 ***
Percentage of 2020 Dividend Growers	6.4%	21.3%	-2.326 **
Percentage of 2020 Dividend Cutters	7.9%	21.3%	-2.08 **
Percentage of HNBE	25.0%	34.0%	-1.146
Percentage of Investment Grade	1.4%	21.3%	-3.244 ***
N	140	47	

Statistical significance at the 1%, 5%, and 10% levels are indicated by ***, **, and *.
See Appendix A for variable definitions.

Table 2 Summary Statistics for 2020 Healthy Equity (HNBE) Firms

Variables	Other ONBE Firms	Healthy HNBE Firms	Z (t) statistic for difference in medians (percentage)
Size			
Median Total Assets ($)	457,000,000	800,000,000	-0.84
Median Total Common Equity ($)	-120,000,000	-207,000,000	0.74
Median Market Value of Equity ($)	438,000,000	5,180,000,000	-6.854 ***
Credit			
Median Altman's Z-score	-0.6059	4.1493	-10.2930 ***
Median EBIT / Interest Expense	-0.2153	2.8639	-3.0800 ***
Median EBIT / Total Liabilities	-0.0181	0.0625	-4.4870 ***
Median Total Liabilities / Total Assets	1.2504	1.2655	0.3060
Profitability			
Median 2019 EBIT / Total Assets	1.3%	11.8%	-3.6620 ***
Median 2020 EBIT / Total Assets	-3.0%	11.0%	-4.7750 ***
Median standard deviation of EBIT / Total Assets	5.2%	4.1%	1.3260
Median 2020 ROA	-16.2%	3.8%	-5.0420 ***
Median Average ROA	-8.3%	3.4%	-4.4050 ***
Assets			
Median Working Capital / Total Assets	0.0830	0.1526	-1.3110
Median Property, plant, equipment / Total Assets	0.1034	0.1321	-0.7740
Median Intangible Assets /Total Assets	0.1034	0.0991	-0.5810
Median Cash / Total Assets	0.1590	0.1962	-1.3380
Median Sales / Total Assets	0.4660	0.8061	-3.8530 ***
Median Total Asset growth rate	8.9%	14.0%	-2.1480 **
Capital			
Median Total Common Equity / Total Assets	-0.2902	-0.2799	-0.1700
Median Retained Earnings / Total Assets	-1.0800	-0.4127	-4.3530 ***
Valuation			
Median Tobin's q	1.6542	8.3765	-7.3380 ***
Median Enterprise Value/ Revenue	13.3500	17.3600	-2.6740 ***
Median Market Value of Equity / Total Liabilities	0.7175	7.1264	-7.9900 ***
Age			
Median Age from Incorporation (years)	22	18	0.126
Percentages			
Percentage of 2019 Dividend Payers	19.1%	29.4%	-1.4140
Percentage of 2020 Dividend Payers	16.9%	29.4%	-1.7350 *
Percentage of 2020 Dividend Growers	5.2%	23.5%	-2.9210 ***
Percentage of 2020 Dividend Cutters	14.0%	3.9%	-2.4790 **
Percentage of LNBE	22.8%	31.4%	-1.145
Percentage of Investment Grade	3.7%	13.7%	-1.959 *
N	136	51	

HNBE firms are more profitable as measured by median EBIT/TA and median ROA, but there isno significant difference in earnings volatility between HNBE and ONBE firms. Also, HNBE firms were more profitable than ONBE firms in 2019 based on median EBIT/TA and average ROAover the past 10 years. HNBE firms have higher median asset growth rate and higher median sales/assets ratio. There is no statistical difference between HNBE and ONBE firms in terms of assets – standardized working capital, property-plant-equipment, intangibles, or cash. In addition, there is no statistical difference in firm age between HNBE and ONBE firms. Since the classification process sorts by q, HNBE firms have higher market valuations as measured by highermedian EV/Sales and higher median ME/TL.

In terms of dividend policy, the 2020 HNBE firms have a higher percentage of dividend payersthan ONBE firms, but the percentage is not as high as the percentage of dividend payers classed as LNBE firms. In addition, the high Z-score HNBE firms, have more dividend growers and fewerdividend cutters. While HNBE firms are larger by market equity and more profitable than ONBEfirms, the HNBE firms have higher growth rates (more investment opportunities) and no statisticaldifference in age. Consequently, the 2020 HNBE firms only have *some* of the traditional Fama- French (2001) characteristics of PBE dividend payers – larger size and more profitable. The HNBEfirms do not have the typical lower growth rates (investment opportunities) and higher age attributes of PBE dividend payers.

EMPIRICAL RESULTS FROM THE INVESTIGATION OF DIVIDEND POLICY

Summary Statistics for 2020 Dividend Paying, Negative Book Equity Firms

Now, I directly investigate the summary statistics and summary percentages for the 2020 dividend paying, negative book equity firms and present the results in Table 3 and Table 4. Consistent with the PBE literature[5], the 2020 NBE dividend payers are larger in size than NBE non-payers based on median total assets, and median market value of equity. A higher percentageof NBE dividend payers are classified as LNBE or HNBE firms, which are considered to be larger,fiscally healthier, and not in financial distress. With similar leverage, the 2020 NBE dividend payers have better credit quality – higher Altman's Z-score, higher interest coverage, higher totaldebt coverage, and a significantly higher percentage of investment-grade rated firms. In fact, about75% of the 2020 NBE non-payers are considered high default risk firms (by Z-scores less than 1.81) and only 1.3% of NBE non-payers are investment-grade rated firms. The 2020 NBE dividend payers are more profitable by median EBIT/TA and median ROA. Furthermore, the 2020NBE dividend payers were more profitable in both 2019 as well as over the past 10 years. In fact,about 80% of the NBE dividend paying firms were profitable, on average, over the past 10 years.In addition to being more profitable, the 2020 NBE dividend payers have lower median earnings volatility than NBE non-payers.

The 2020 NBE dividend payers have a somewhat different balance sheet asset structure than NBE non-payers, with NBE dividend payers having more long-term assets but less cash. Interestingly, Hauser and Thornton (2017b) show that PBE dividend payers also have lower cashratios PBE non-payers. Consistent with the firm life cycle or maturity hypothesis for dividend policy, the 2020 NBE dividend payers have a lower median asset growth rate and a higher age.

[5] Fama and French (2001); DeAngelo, DeAngelo, and Stulz (2006); Hauser and Thornton (2016,2017a)

Table 3 Summary Statistics for 2020 Dividend Paying Negative Book Equity Firms

Variables	Non-Paying Firms	Dividend Paying Firms	Z statistic for difference in medians
Size			
Median Total Assets ($)	324,000,000	5,640,000,000	-6.477 ***
Median Total Common Equity ($)	-102,000,000	-806,000,000	5.557 ***
Median Market Value of Equity ($)	634,000,000	6,260,000,000	-5.298 ***
Median NYSE Percentile of Median Market Value of Equ	0.10	0.55	
Credit			
Median Altman's Z-score	0.1341	1.8415	-3.895 ***
Median EBIT / Interest Expense	-0.3098	3.1122	-5.097 ***
Median EBIT / Total Liabilities	-0.0448	0.0822	-5.577 ***
Median Total Liabilities / Total Assets	1.2737	1.1871	1.266
Profitability			
Median 2019 EBIT / Total Assets	-3.4%	10.4%	-5.802 ***
Median 2020 EBIT / Total Assets	-5.6%	10.5%	-5.47 ***
Median standard deviation of EBIT / Total Assets	5.3%	3.7%	2.659 ***
Median 2020 ROA	-18.2%	2.2%	-5.12 ***
Median Average ROA	-13.5%	6.3%	-6.457 ***
Median 2020 ROA minus Average ROA	-4.2%	-3.1%	-0.557
Assets			
Median Working Capital / Total Assets	0.1059	0.0596	0.89
Median Property, plant, equipment / Total Assets	0.0997	0.1597	-2.723 ***
Median Intangible Assets /Total Assets	0.0870	0.1670	-1.977 **
Median Cash / Total Assets	0.2298	0.1364	2.599 ***
Median Sales / Total Assets	0.5156	0.6893	-1.951 *
Median Total Asset growth rate	14.8%	3.6%	3.525 ***
Capital			
Median Total Common Equity / Total Assets	-0.3027	-0.1871	-2.065 **
Median Retained Earnings / Total Assets	-1.1126	-0.2766	-5.349 ***
Valuation			
Median Tobin's q	2.5612	1.9430	1.662 *
Median Enterprise Value/ Revenue	14.6100	13.9350	0.575
Median Market Value of Equity / Total Liabilities	1.3447	0.9168	1.088
Age			
Median Age from Incorporation (years)	17	58	-5.318 ***
N	149	38	

Statistical significance at the 1%, 5%, and 10% levels are indicated by ***, **, and *.
See Appendix A for variable definitions.

Table 4 Summary Percentages for 2020 Dividend Paying Negative Book Equity Firms

Variables	Non-Paying Firms	Dividend Paying Firms	t statistic for difference in percentage
LNBE , HNBE			
Percentage of LNBE Firms	16.8%	57.9%	-4.738 ***
Percentage of HNBE Firms	24.2%	39.5%	-1.746 *
Credit			
Percentage of Investment Grade Firms	1.3%	26.3%	-3.421 ***
Percentage of High Default Risk Firms (by Z-score)	74.5%	50.0%	2.732 ***
Profitability			
Percentage of Profitable Firms (Average)	20.1%	79.0%	-7.874 ***
Percentage of Profitable Firms (2020)	20.8%	58.0%	-4.226 ***
Payout Policy			
Percentage of 2019 Dividend Payers	3.4%	94.7%	-23.087 ***
Percentage of 2020 Dividend Growers	0.0%	50.0%	-6.0828 ***
Percentage of 2020 Dividend Cutters	3.4%	42.1%	-4.697 ***
Percentage of Payers with Unsustainable Payout Ratio	-	52.6%	-6.412 ***
Percentage of Firms with Prior Repurchases	30.9%	89.5%	-9.28 ***
Capital			
Percentage of Firms with Positive RE/TA	2.0%	23.7%	-3.059 ***
Percentage of Firms Financing with Preferred Stock	20.8%	0.0%	6.236 ***
Sectors			
Percentage of Consumer Cyclicals	17.4%	39.5%	-2.555 **
Percentage of Consumer Defensive	1.3%	2.6%	-0.461
Percentage of Industrials	10.1%	15.8%	-0.8
Percentage of Technology	18.8%	15.8%	0.4
Percentage of Health Care	32.9%	5.3%	5.184 ***
Percentage of Communication Services	11.4%	13.2%	-0.2
Percentage of Energy	5.4%	7.9%	-0.5
Percentage of Basic Materials	2.7%	0.0%	2.021 **
N	149	38	

Statistical significance at the 1%, 5%, and 10% levels are indicated by ***, **, and *.
See Appendix A for variable definitions.

Also consistent with the life-cycle hypothesis for dividend policy, the 2020 NBE dividend payershave a higher (but still negative) median RE/TA. An interesting point is that only 24% of 2020 NBE dividend paying firms have a positive RE/TA. The NBE dividend payers have somewhat lower market valuations than NBE non-payers as measured by median q and median EV/Sales ratio; however, only the lower median q is statistically significant (at 10% level). Notably, the literature of PBE dividend payers shows that they have somewhat lower market valuations than

PBE non-payers as measured by median M/B ratio.[6] While NBE firms must have a negative TE/TAratio, by definition, the 2020 NBE dividend payers have a greater median TE/TA. Although an investigation of capital structure is outside the scope of this research, *none* of the 2020 NBE dividend paying firms use preferred stock in the capital structure, while 21% of NBE non-payers use preferred stock for financing.

Although the sample size limits a complete industry analysis of the 2020 NBE firms, an examination of industry sectors is instructive. The 2020 NBE dividend payers are significantly more prevalent in the Consumer Cyclicals industry sector, while the 2020 NBE non-payers are more predominant in the HealthCare industry sector. The percentage of 2020 NBE dividend payersis not statistically different from the 2020 NBE non-payers in the Consumer Defensive, Industrials,Technology, Communication Services, or Energy industry sectors.

An assessment of the payout policy of the 2020 NBE dividend payers shows that 90% of thesefirms repurchased shares at least one time within the last 10 years, while 95% of the 2020 NBE dividend payers paid a dividend in 2019, which is consistent with the literature of PBE dividend payers. In addition, I classify 50% of the 2020 NBE dividend payers as dividend growers, while 42% are dividend cutters. The fact that dividend growers even exist amongst NBE firms may seemsurprising given the perception of NBE firms. In DeAngelo and DeAngelo's (1990) study of distressed firms, they report that "almost all [*distressed*] sample firms reduced dividends". Threepercent of 2020 NBE non-payers previously paid a dividend in 2019 but omitted the dividend in 2020.

To summarize the analysis of the univariate, descriptive statistics for the 2020 NBE firms, theresults confirm the prior NBE literature that a portion of 2020 NBE firms, especially NBE dividendpayers, are financially healthy (about 28% of NBE firms were profitable in 2020) and not in financial distress. The investigation finds that LNBE and HNBE firms do have a higher percentageof dividend payers and dividend growers than SNBE or ONBE firms, which are not considered financially healthy. Most importantly, the examination of the 2020 NBE dividend paying firms indicates that the NBE dividend paying firms have the same characteristics of PBE dividend paying firms reported in the dividend policy literature. Identical to the prior research of PBE dividend payers, I find the 2020 NBE dividend payers to be larger, more profitable, older, and withhigher earned capital.

Logit Regressions for 2020 Dividend Paying, Negative Book Equity Firms

After analysis of the summary statistics, I report the results of the multivariate logit regressions for the probability that a 2020 NBE firm pays a dividend in Table 5. In the logit regressions, I report 6 models[7] to investigate the multivariate relationship to the probability of paying a dividend. In the first 2 logit regressions (Model 1 and Model 2), the explanatory variablesare simply the classification of LNBE and HNBE (modeled as q and Z). In these two simple logit regressions, being classified as LNBE and HNBE (modeled with q and Z) firms increases the probability that a NBE firm pays a dividend in 2020. While the LNBE and HNBE variables are significant in the simple models, the overall fit is rather poor with low Pseudo R^2 values. In the next 2 logit regressions (Model 3 and Model 4), I add the explanatory variables from the DeAngelo, DeAngelo, Stulz (2006) life-cycle model to the LNBE and HNBE variables. The results in Table 5 report that being an LNBE or HNBE firm is not significant when the logit regression controls for firm size, profitability, asset growth rate, and RE/TA (all of which are significant at the 1% or5% level). Furthermore, the inclusion of the highly significant firm size, profitability, asset growthrate, and RE/TA variables greatly increases the Pseudo R^2 values and correct classifications. In Model 5, firm age is incorporated with the DeAngelo, DeAngelo, Stulz (2006) life-cycle model variables. Although adding the firm age variable does not improve the Pseudo R^2 value or correct classifications, the firm age is statistically meaningful (while still controlling with the highly significant firm size, profitability, asset growth rate, and RE/TA variables).

[6] In the negative book equity (NBE) literature, q is used as an alternative to the M/B ratio.
[7] Models including industry sectors showed no significance when controlled for size, growth, profitability, andearned capital.

Table 5 Logit Regressions for the Probablity of a 2020 Dividend Paying NBE Firm
Variable Coefficients (standard errors in parentheses)

Variable	Logit Model					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	-0.9431 ***	-2.0477 ***	-8.9572 ***	-13.4696 ***	-13.3212 ***	-24.1407 **
	(0.2337)	(.2656)	(3.3051)	(3.4341)	(3.5001)	(9.4911)
q	-0.0974 **			0.0645		
	(0.0426)			(.1077)		
Z LNBE	0.0773 **					
	(.0313)					
		1.9199 ***	0.5363			
		(.3950)	(.5674)			
Size			0.3912 **	0.606 ***	0.5226 ***	0.9796 **
			(.1577)	(.1576)	(.1492)	(.4138)
Profitabilty			3.2803 **	3.997 **	2.9724 **	1.3397
			(1.5756)	(1.7995)	(1.4632)	(2.2763)
Asset Growth			-5.3588 ***	-5.7268 **	-5.8021 ***	-8.038 *
			(1.9962)	(2.3899)	(2.1430)	(4.7917)
RE/TA			0.6372 **	0.5762 **	0.5756 **	0.1992
			(.3064)	(.2801)	(.2641)	(.3822)
TCE/TA			0.0784			
			(.5900)			
Cash/TA			0.2263			
			(1.8135)			
WC/TA				2.2091 *	1.4638	
				(1.2318)	(1.1157)	
ME/TL				-0.276		
				(.2202)		
Sales/TA				0.1706		
				(.3426)		
Age					0.4564 *	-0.2282
					(.2518)	(0.4693)
2019 Prior Dividend						7.5694 ***
						(1.7962)
Pseudo R^2	0.0711	0.1289	0.424	0.4557	0.4493	0.8501
Correct	79.1%	79.7%	86.1%	87.2%	86.6%	97.9%

Statistical significance at the 1%, 5%, and 10% levels are indicated by ***, **, and *.
See Appendix A for variable definitions.

The logit regression analysis of NBE firms in Models 3-5 confirms the univariate analysis. That is the same reported characteristics of PBE dividend paying firms (larger size, higher profitability, lower growth rates,higher RE/TA, and higher age) increased the probability of a 2020 NBE firm paying a dividend. Even controlling for size, profitability, asset growth rate, RE/TA, and age in Model 6, paying a prior dividend in 2019 significantly increased the probability of an NBE paying a dividend in 2020.Model 6, which includes the prior dividend paying status greatly improves the model fit to a Pseudo R^2 of .85 with 98% of NBE firms correctly classified.

Summary Characteristics of 2020 NBE Dividend Payers

Based on the summary statistics and logit regressions, the significant attributes thatdifferentiate the 2020 NBE dividend payers from the NBE non-payers are as follows.

Size
The 2020 NBE dividend payers are much larger in asset size and market capitalization compared to NBE non-payers. The median NYSE Percentile for the market value of equity is the 55% NYSEPercentile for NBE dividend payers compared to the 10% NYSE Percentile for NBE non-payers (reported in Table 3). This compares remarkably well to Hauser and Thornton's (2016,2017a) findings of 40% NYSE Percentile for PBE dividend payers and the 10% NYSE Percentile for PBEnon-payers. Increasing size significantly increases the probability that a 2020 NBE firm pays a dividend.

Profitability
The 2020 NBE dividend payers are much more profitable than NBE non-payers and again, very similar in median profitability to PBE dividend payers in the literature. The median 2020 NBE non-paying firm is not profitable. While median profitability is down in 2020, the average ROA over the last 10 years for the 2020 NBE dividend payers is 6.26% (reported in Table 3) comparedto Hauser and Thornton's (2016, 2017a) findings of a median ROA of 5.67% for PBE dividend payers. Increasing profitability significantly increases the probability that a 2020 NBE firm paysa dividend.

Lower Growth Rates
The 2020 NBE dividend payers have lower asset growth rates than the NBE non-payers consistentwith life-cycle models typically investigated with only PBE firms. Logit regressions indicate thatlower asset growth rates (negative asset growth variable coefficient in Table 5) increase the probability that a 2020 NBE firm pays a dividend.

Higher Firm Age (from incorporation)
The 2020 NBE dividend payers have a greater median firm age (58 years) than the NBE non- payers (17 years), which is consistent with the maturity hypothesis literature[8] for PBE dividend payers. Logit regressions (in Table 5) show that higher firm age increases the probability that a 2020 NBE firm pays a dividend.

Greater earned capital, RE/TA
The 2020 NBE dividend payers have significantly greater earned capital, RE/TA than the NBE non-payers, which is consistent with the life-cycle model and maturity hypothesis in the PBE dividend payer research (DeAngelo and DeAngelo, 2007). While the median RE/TA of the 2020NBE dividend payers is larger than NBE non-payers, the median RE/TA is negative and consequently much lower (and opposite in sign) than the past literature on PBE dividend payers. The median RE/TA of the 2020 NBE dividend payers is -0.277 (reported in Table 3) compared toa median RE/TA of PBE dividend payers of 0.347 reported by Hauser and Thornton (2016, 2017a)and 0.341 reported by DeAngelo, DeAngelo, and Stulz (2006). Logit regressions (in Table 5) showthat a larger RE/TA increases the probability that a 2020 NBE firm pays a dividend.

The RE/TA Quandary

The fact the 2020 NBE dividend payers have a negative median RE/TA presents considerable problems incorporating NBE firms in data sets with PBE firms for Dividend Policy research when the RE/TA variable is to be investigated.

[8] See, for example, Grullon, G., Michaely, R., and Swaminathan, B., (2002) and Julio, B., and Ikenberry, D., (2004).

The negative median RE/TA for the 2020NBE *dividend payers* (-.277) is less than the reported values of the median RE/TA for PBE *non- payers* [0.035 by Hauser and Thornton (2016,2017a) and 0.015 by DeAngelo, DeAngelo, and Stulz (2006)]. Consequently, even a relatively large RE/TA (i.e., above the -0.277 median RE/TA for NBE dividend payers) in the NBE sample would be relatively small in the PBE sample. An issuehere is the "classical" interpretation of the RE/TA ratio versus accounting practices for stock repurchases. In the "classical" interpretation of the RE/TA ratio, dividend paying firms are very profitable with sizable accumulated retained earnings that can be distributed to shareholders whilenon-paying firms had low profitability with little accumulated retained earnings for distribution. However, some accounting practices for stock repurchases reduce the value of the retained earnings rather than the value of the contributed capital[9]. Consequently, a firm with large share repurchases can have negative retained earnings due to the accounting of the stock repurchases rather than accumulated losses. Figure 1 depicts an example of this issue with 2020 NBE firms Starbucks and Yum! Brands with reported negative retained earnings. As can be seen in Figure 1,the negative retained earnings for these firms is due to accounting of repurchases and not accumulated losses since these firms were always profitable over the period.

Not only does this RE/TA quandary create problems for the analysis of the dividend policyfor NBE firms, but it also confounds the determination of financial distress. The issue of a negativeRE/TA for a financially healthy firm (such as Starbucks with investment-grade rated debt in 2020)also muddles the Altman's Z score, which uses RE/TA as a factor in the model. A negative RE/TAlowers Altman's Z score, even if the firm is financially sound (such as Starbucks in 2020) and simply accounts for stock repurchases by reducing the retained earnings account. It is outside of the scope of research for this project to resolve this RE/TA quandary, and it is left for future research.

[9] For a detailed discussion on the accounting of stock repurchases and its effect on the components of equity, seeBall, Gerakos, Linnainmaa, Nikolaev (2020).

Figure 1 Retained Earnings and Net Income for 2020 NBE Firms StarbucksCorporation and Yum! Brands, Inc. (2011 -2020)

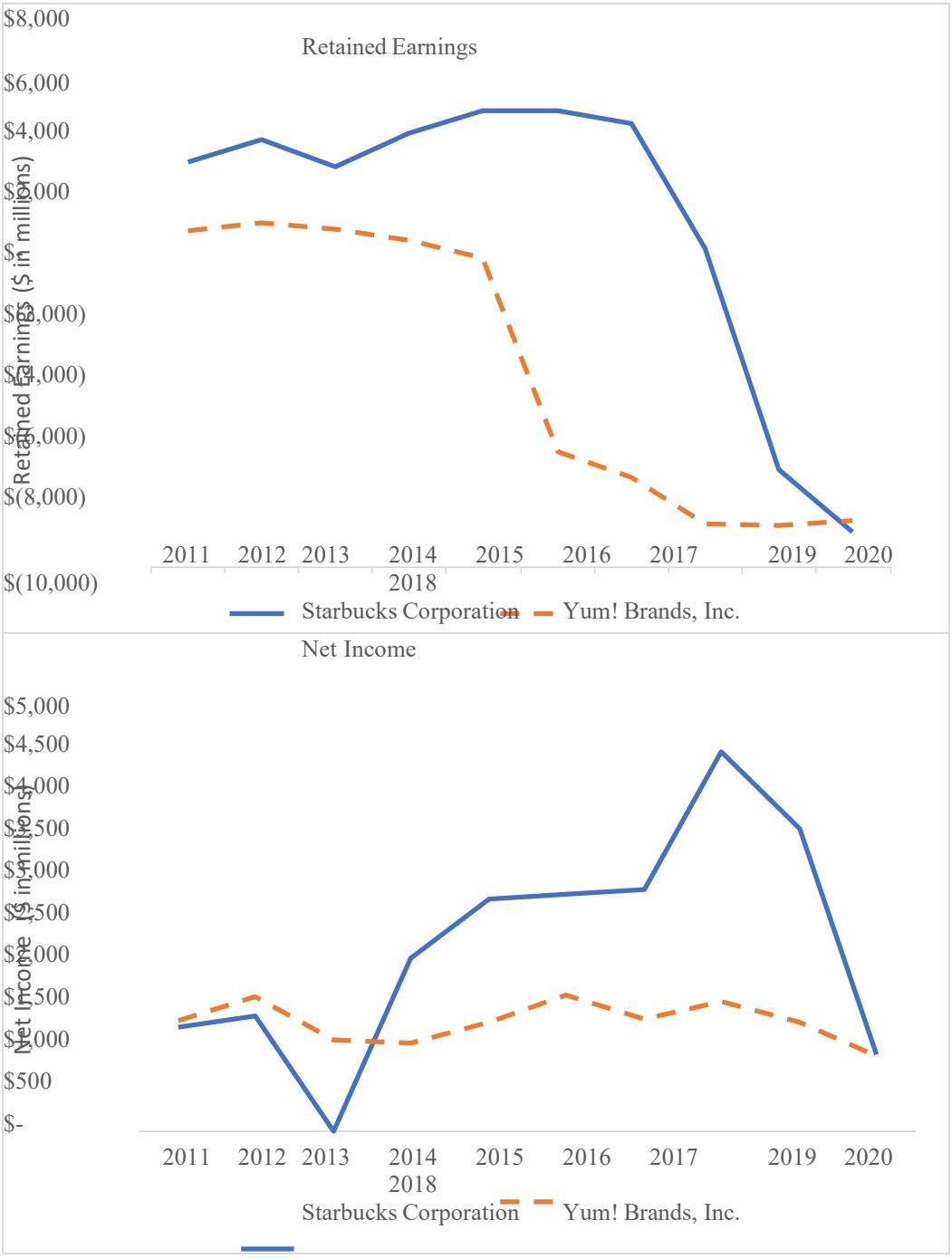

Figure 1 shows that the accumulated retained earnings of Starbucks Corporation and Yum! Brands fell dramatically despite the fact that net income was always positive over the time period. The declines in retained earnings correspond to large share repurchases where repurchases are subtracted from retainedearnings rather than contributed capital.

SUMMARY STATISTICS FOR 2020 DIVIDEND GROWING, NEGATIVE BOOK EQUITY FIRMS

Finding that the characteristics of dividend paying NBE firms are nearly identical to the firm characteristics of dividend paying PBE firms, I turn my attention to the payout policy of NBE dividend payers, specifically dividend growers. The findings of the empirical analysis and descriptive statistics of the 2020 NBE dividend growing firms are reported in Table 6.

The descriptive statistics for the 2020 NBE dividend growers show the subset to be the most financially healthy NBE firms. The 2020 NBE dividend growers with the median market equity atthe 75% of NYSE percentile are *much larger* in market equity than the NBE dividend cutters, andthat median market equity is much larger than all NBE dividend paying firms or any subset of NBE firms studied in this research. Given this difference in size of market equity, it is surprising that the size of the median assets and median common book equity of the NBE dividend growers is not statistically different from dividend cutters.

Not surprisingly, the 2020 NBE dividend growers have much better credit quality than dividend cutters – higher Altman Z score, higher interest coverage, and higher total debt coverage.The interest coverage and total debt coverage ratios of the NBE dividend growers are the best ratios of any NBE firm subset in this study – even the HNBE firms specifically sorted by high Z-score. Although the 2020 NBE dividend growers have a higher median TL/TA leverage ratio, it isnot statistically different from the NBE dividend cutters. The NBE dividend growers have a significantly higher percentage of investment-grade rated firms with almost half of the 2020 NBEdividend growers rated as investment-grade. As expected, the 2020 NBE dividend growing firmsare the most profitable subset of NBE firms examined. The NBE dividend growers are more profitable by median EBIT/TA, ROA, or any other measure of profitability in the study. The 2020NBE dividend growers achieve the higher levels of profitability with lower earnings volatility thanNBE dividend cutters. Hauser and Thornton (2015) find that PBE dividend growers also attain higher high levels of profitability with lower risk.

The 2020 NBE dividend growers have a higher median asset growth rate than the NBE dividend cutters. Although, the 2020 NBE dividend growers have the highest median asset growthrate among the NBE dividend payers, the NBE dividend grower's median asset growth rate is lower than the median asset growth rate of NBE non-payers. These growth rate results are very similar to the findings reported by Hauser and Thornton (2015) for PBE dividend growers. The PBE dividend growth research by Hauser and Thornton (2015) shows that PBE dividend growershave higher sales and earnings growth rates than PBE dividend cutters, but lower than PBE non- payers.

The 2020 NBE dividend growers have a significantly higher valuation measured by higher median q. The Tobin's q and EV/Sales valuation ratios of the NBE dividend growers are even higher than the q and EV/Sales valuation ratios of the NBE non-payers, although the higher EV/sales ratio of the NBE dividend growers is not statistically significant. Furthering the issue ofthe RE/TA quandary, even the NBE dividend growers have a negative median RE/TA earned capital ratio. In terms of dividend payout policy, the 2020 NBE dividend growers pay a significantly higher median cash dividend than NBE dividend cutters, but essentially have the same median dividend yield. Research by Hauser and Thornton (2015) also shows that PBE dividend growers have higher median cash dividends (per share) than PBE dividend cutters.

Table 6 Summary Statistics for 2020 Dividend Growing and Dividend Cutting NegativeBook Equity Firms

Variables	Dividend Growing Firms	Z statistic	Dividend Cutting Firms	Z statistic
Size				
Median Total Assets ($)	5,850,000,000	-0.044	2,950,000,000	-0.030
Median Total Common Equity ($)	-558,000,000	-0.102	-806,000,000	0.030
Median Market Value of Equity ($)	17,500,000,000	-3.304 ***	2,350,000,000	2.779 ***
NYSE Percentile of Median Market Value of Equity	0.75		0.30	
Credit				
Median Altman's Z-score	2.8555	-4.131 ***	0.7496	4.228 ***
Median EBIT / Interest Expense	6.4272	-4.306 ***	0.4064	4.701 ***
Median EBIT / Total Liabilities	0.1192	-3.956 ***	0.0108	4.464 ***
Median Total Liabilities / Total Assets	1.3655	-0.657	1.1230	0.739
Profitability				
Median 2019 EBIT / Total Assets	16.9%	-3.197 ***	8.3%	2.631 ***
Median 2020 EBIT / Total Assets	15.3%	-4.043 ***	1.2%	4.464 ***
Median standard deviation of EBIT / Total Assets	1.5%	2.496 **	4.6%	-2.365 **
Median 2020 ROA	9.0%	-4.189 ***	-6.2%	3.903 ***
Median Average ROA	8.4%	-3.868 ***	1.4%	3.814 ***
Median 2020 ROA minus Average ROA	0.9%	-3.518 ***	-9.3%	3.045 ***
Assets				
Median Cash / Total Assets	0.1495	-1.504	0.1077	0.798
Median Sales / Total Assets	0.9658	-2.992 **	0.3651	3.370 ***
Median Total Asset growth rate	4.6%	-1.270	0.8%	2.010 **
Capital				
Median Total Common Equity / Total Assets	-0.2804	0.511	-0.1283	-0.562
Median Retained Earnings / Total Assets	-0.2661	-0.598	-0.2939	0.325
Valuation				
Median Tobin's q	3.3362	-3.372 ***	1.0318	3.725 ***
Median Enterprise Value/ Revenue	16.7400	-1.182	11.5900	0.828
Median Market Value of Equity / Total Liabilities	2.3253	-3.985 ***	0.4041	4.110 ***
Dividend Policy				
Median 2019 Regular Cash Dividend ($/share)	$1.44	-0.979	$0.78	0.385
Median 2020 Regular Cash Dividend ($/share)	$1.66	-3.709 ***	$0.28	3.327 ***
Median 2020 Dividend Yield	1.6%	0.774	1.7%	-0.976
Median 2020 Dividend Payout Ratio	38.5%	0.448	96.5%	-0.599
Percentages				
Percentage of LNBE	52.6%	0.643	62.5%	-0.480
Percentage of HNBE	63.2%	3.325 ***	6.3%	4.697 ***
Percentage of Investment Grade	47.4%	-3.266	6.3%	2.791 ***
Percentage of Profitable Firms (Average)	94.7%	2.521 **	62.5%	2.031 *
Percentage of Profitable Firms (2020)	84.2%	-3.780 ***	25.0%	4.060 ***
Percentage of Payers with Unsustainable Payout Ratio	26.3%	3.721 ***	81.3%	-3.454 ***
N	19		16	

Statistical significance at the 1%, 5%, and 10% levels are indicated by ***, **, and *.
See Appendix A for variable definitions.

In sum, the descriptive statistics of NBE dividend growers show the same firm characteristics of PBE dividend growers – larger market capitalization, better credit quality, higher profitability withlower volatility, and higher growth rates.

The 2020 NBE dividend cutters basically have the opposite characteristics of NBE dividend growers. The NBE dividend cutters have lower median market equity value, have poor credit quality with such low operating profitability that interest expenses cannot be covered (the medianinterest coverage ratio is less than 1). The 2020 NBE dividend cutters have high median earningsvolatility with low median asset growth rates. Only 25% of NBE dividend cutters are profitable in2020 leading to over 80% of NBE dividend cutters to have an unsustainable payout ratio (either a negative payout ratio or a payout ratio over 100%).

Logit Regressions for 2020 Dividend Paying, Negative Book Equity Firms

In order to confirm the univariate analysis of the 2020 NBE dividend growers, I investigate themultivariate relationship to the probability of a 2020 NBE dividend payer increasing the dividendin 2020. The results of the multivariate logit regressions are reported in Table 7.

In the first 2 logit regressions (Model 1 and Model 2), the explanatory variables are simply theclassification of LNBE and HNBE. The logit regression results for Model 1 show that being classified as an HNBE firm increases the probability that a dividend paying NBE firm increases the dividend in 2020. While the HNBE variable is significant in the simple Model 1, the overall fit is rather poor with a relatively low Pseudo R^2 value. In the Model 2 logit regression, being an LNBE is not significantly related to an NBE dividend paying firm growing the dividend in 2020. In the next 2 logit regressions (Model 3 and Model 4), the logit regression controls for size, profitability, and earnings volatility per the Hauser and Thornton (2015) dividend grower model for PBE dividend payers. In the Model 3 baseline logit regression, the probability of being an NBEdividend grower in 2020 increases with larger size, higher profitability, and lower earnings volatility. The Model 3 baseline logit regression provides an excellent fit of the data with a Pseudo R^2 of .63 as well as 92% of the observations correctly classified. In Model 4, the HNBE variable is included with the baseline Model 3 variables. After controlling for market equity size, profitability, and earnings volatility the HNBE variable is not statistically significant, while size, profitability, and earnings volatility remain significant. In Model 5, the ROA profitability variablein the baseline Model 3 is replaced with EBIT/TA. Although Model 5 is an excellent fit of the data, it provides no improvement over Model 3. In Model 6, the HNBE variable is included with Model 5 variables (with EBIT/TA for profitability). After controlling for market equity size, profitability, and earnings volatility in Model 6, again the HNBE variable is not statistically significant, while size, profitability, and earnings volatility remain significant.

In sum, the logit regression analysis of NBE dividend growing firms reported in Table 7 confirmsthe univariate analysis for the characteristics of NBE dividend paying firms that increase the dividend in 2020. In fact, the *same* reported characteristics of larger market equity size, higher profitability, and lower volatility that increase the probability of being a PBE dividend growing firm (Hauser & Thornton, 2015b) also increase the probability of an NBE dividend paying firm growing the dividend in 2020.

Table 7 Logit Regressions for the Probablity of a 2020 Dividend Growing NBE Firm
Variable Coefficients (standard errors in parentheses)

Variable Logit Model						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	-0.8267 *	0.2513	-16.5177 *	-17.5326 **	-19.8205 **	-20.1801 **
	(0.4532)	(.5040)	(8.5824)	(9.2954)	(9.2284)	(9.2970)
HNBE	2.213 **			-1.0035		-0.4363
	(0.7887)			(1.5391)		(1.3231)
LNBE		-0.4336				
		(.6613)				
Size			0.7983 **	0.8516 **	0.8623 **	0.8767 **
			(.3917)	(.4289)	(.4023)	(.4023)
Profitabilty			20.2379 *	26.9129 *		
			(10.9271)	(14.6882)		
					17.8628 **	19.5843 **
					(8.4623)	(9.5966)
Earnings Volatility			-64.4567 **	-69.6858 **	-51.8241 *	-51.7889 *
			(32.1465)	(34.337)	(28.2281)	(28.5146)
2019 Cash Dividend			-0.1148		-0.0245	
			(.3961)		(.4064)	
Pseudo R^2	0.1784	0.0082	0.6313	0.6385	0.600	0.6021
Correct	73.68%	55.26%	92.11%	89.47%	92.11%	89.47%

Statistical significance at the 1%, 5%, and 10% levels are indicated by ***, **, and *.
See Appendix A for variable definitions.

Matched Sample 2020 Dividend Paying, Negative Book Equity Firms with 2020 DividendPaying Positive Book Equity firms

As a robustness test on the univariate descriptive statistics and the multivariate logit regressions, I perform an analysis between the 2020 NBE dividend payers and a matched sample of 2020 PBE dividend payers. The NBE and PBE dividend payers are matched for size (market equity capitalization) and dividend payout policy (dividend grower or dividend non-grower). Thecomparison results of the 2020 NBE dividend payers and the matched sample of 2020 PBE dividend payers are shown in Table 8.

As Table 8 shows in Panel A, the overall 2020 NBE dividend payers are well matched with the 2020 PBE dividend payers on the basis of market equity value. The 2020 operating performance between NBE dividend payers and matched PBE dividend payers is remarkably similar in terms of median profitability and median asset growth rate. In fact, the 2020 profitabilityas measured by median ROA is 2.22% for both the 2020 NBE dividend payers and the matched 2020 PBE dividend payers. While even the median age of the 2020 NBE dividend payers and the

Table 8 Comparisons of 2020 NBE Dividend Payers and 2020 Matched PBE Dividend Payer

Panel A Dividend Payers		
Variable	2020 NBE Dividend Payers	2020 Matched PBE Dividend Payers
Size[1]		
Median Market Value of Equity ($)	6,260,000,000	6,700,000,000
NYSE Percentile of Median Market Value of Equity	0.55	0.55
Profitability		
Median EBIT/TA	10.5%	5.8%
Median ROA (2020)	2.2%	2.2%
Growth		
Median Asset Growth Rate	3.6%	2.3%
Age		
Median Age from Incorporation (years)	58	51
Capital Ratios[2]		
Median RE/TA	-0.2766	0.2207
Median TE/TA	-0.1871	0.3265
Panel B Dividend Growers		
Variable	2020 NBE Dividend Growers	2020 Matched PBE Dividend Growers
Size[1]		
Median Market Value of Equity ($)	17,500,000,000	18,600,000,000
NYSE Percentile of Median Market Value of Equity	0.75	0.75
Profitability		
Median EBIT/TA	15.3%	11.8%
Median ROA (2020)	9.0%	7.2%
Earnings Volatility		
Median standard deviation of EBIT/TA	1.5%	1.5%
Capital Ratios[2]		
Median TE/TA	-0.2804	0.4005
Median RE/TA	-0.2661	0.2657
Panel C Dividend Cutters		
Variable	2020 NBE Dividend Cutters	2020 Matched PBE Dividend Cutters
Size[1]		
Median Market Value of Equity ($)	2,350,000,000	1,885,000,000
NYSE Percentile of Median Market Value of Equity	0.30	0.30
Profitability		
Median EBIT/TA	1.2%	2.4%
Median ROA (2020)	-6.2%	-2.5%
Earnings Volatility		
Median standard deviation of EBIT/TA	4.6%	4.0%
Capital Ratios[2]		
Median TE/TA	-0.1283	0.2423
Median RE/TA	-0.2939	0.1956

[1] NBE and PBE Dividend payers are matched on the basis of market value of equity

[2] NBE and PBE Dividend payers have opposite sign capital ratios by definition

matched 2020 PBE dividend payers is similar, by definition, the median TE/TA equity capital ratios are opposite in sign. As per the above discussion regarding the RE/TA quandary, the NBE dividend payers have a negative median RE/TA ratio while the matched PBE dividend payers havea positive RE/TA (as well documented in the literature for PBE dividend payers.

In Panel B of Table 8, the 2020 NBE dividend growers are also well matched with the 2020 PBE dividend payers on the basis of market equity value. The 2020 operating performance between NBE dividend payers and matched PBE dividend payers is remarkably similar in terms of median profitability and median earnings volatility. As per the univariate analysis, both the 2020NBE dividend growers and the 2020 PBE dividend growers have high median profitability with low earnings volatility. While the operating performance of the 2020 NBE dividend growers and the matched 2020 PBE dividend growers is nearly equivalent, by definition, the median TE/TA equity capital ratios are opposite in sign.

To summarize, the robustness test of the matched sample of PBE dividend payers confirms theconclusions of the univariate summary statistics and multivariate logit regressions. Although the 2020 NBE dividend payers (growers) and the matched PBE dividend payers (growers) have opposite sign equity capital ratios, the same operating performance parameters characterize *both* NBE and PBE dividend policy and dividend growth. Moreover, the 2020 operating performance of the NBE dividend payers and the matched PBE dividend payers is remarkably similar.

CONCLUSIONS

This study provides evidence confirming the recent NBE literature that a portion of 2020 NBEfirms, especially NBE dividend payers and dividend growers, are financially healthy and not infinancial distress. For example, about 95% of the 2020 NBE dividend growers are profitable overthe past 10 years, and about 50% of the 2020 NBE dividend growers are rated investment-grade.The investigation finds that the prior literature of negative book equity firms classified as LNBEfirms by Ang (2015) and HNBE firms by Luo, Liu, and Tripathy (2021) have a higher percentage of dividend payers and dividend growers than financially distressed SNBE or ONBE firms. Thisstudy shows that LNBE and HNBE firms have some of the characteristics of PBE dividend payers.Most importantly, this investigation of the 2020 NBE dividend paying firms indicates that the NBE dividend paying firms have the same characteristics of PBE dividend paying firms reportedin the prior dividend policy literature. This paper shows that the 2020 NBE dividend payers arelarger, more profitable, older, and with higher earned capital - identical to the prior research of PBE dividend payers.

Based on analysis of the summary statistics and logit regressions, the significant attributes of the 2020 NBE dividend payers are as follows. The 2020 NBE dividend payers are much larger inasset size and market capitalization compared to NBE non-payers, and the NYSE percentile compares remarkably well to Hauser and Thornton's (2016, 2017a) findings for PBE dividend payers. Logit analysis shows that increasing size significantly increases the probability that a 2020NBE firm pays a dividend. The 2020 NBE dividend payers are much more profitable than NBE non-payers and again are similar in median profitability to PBE dividend payers in the literature. Based on logit analysis, increasing profitability significantly increases the probability that a 2020NBE firm pays a dividend. The 2020 NBE dividend payers have lower asset growth rates than theNBE non-payers consistent with the life-cycle model developed with PBE firms. Logit regressionsindicate that lower asset growth rates (lower investment opportunities) increase the probability thata 2020 NBE firm pays a dividend. The 2020 NBE dividend payers have a greater median age (58years) than the NBE non-payers (17 years), which is also consistent with the maturity hypothesis literature for PBE dividend payers. This research shows that higher firm age increases the probability that a 2020 NBE firm pays a dividend. Based on these results, NBE firms appear to follow a dividend policy based on a life cycle or maturity model similar to PBE firms. The 2020 NBE dividend payers have significantly greater RE/TA than the NBE non-payers consistent with the life-cycle model and maturity hypothesis in the PBE dividend payer research. While the median RE/TA of the 2020 NBE dividend payers is larger than NBE non-payers, the median RE/TA is *negative* and consequently much lower (and oppositive in sign) than the past literature on PBE dividend payers. Logit regressions show that a larger RE/TA increases the probability that a 2020 NBE firm pays a dividend. The fact the 2020 NBE dividend payers have anegative median RE/TA presents a considerable quandary incorporating NBE firms in data sets with PBE firms for Dividend Policy research when the RE/TA variable is to be investigated. The quandary seems to arise because some NBE firms have negative RE/TA due to accounting practices for share repurchases and some NBE firms have negative RE/TA due to accumulated losses.

Analysis of the 2020 NBE dividend growers shows the dividend grower subset to be the mostfinancially healthy NBE firms. The 2020 NBE dividend growers are *much larger* in market equitythan any type of NBE firms studied in this research. Moreover, the 2020 NBE dividend growers have much better credit quality than other NBE dividend payers with higher Altman Z score, higherinterest coverage, and higher total debt coverage. The interest coverage and total debt coverage ratios of the NBE dividend growers are the best ratios of any NBE firm subset in this study – eventhe HNBE firms specifically sorted by high Z-score.

The 2020 NBE dividend growing firms are the most profitable category of NBE firms examined. The NBE dividend growers are more profitable by median EBIT/TA, ROA, or any othermeasure of profitability in the study. The 2020 NBE dividend growers achieve the higher levels of profitability with lower earnings volatility than NBE dividend cutters. In fact, this study of NBEdividend growers shows the same firm characteristics of PBE dividend growers – larger market capitalization, better credit quality, higher profitability with lower volatility, and higher growth rates.

The logit regression analysis of NBE dividend growing firms confirms the univariate analysisfor the characteristics of NBE dividend growers in 2020. Indeed, the *same* reported characteristics of larger market equity size, higher profitability, and lower volatility that increase the probabilityof being a PBE dividend growing firm (Hauser & Thornton, 2015b) also increase the probability of an NBE dividend paying firm growing the dividend in 2020.

Finally, a robustness test of the matched sample of PBE dividend payers confirms theunivariate summary statistics and multivariate logit regressions. Although the 2020 NBE dividendpayers (and growers) and the matched PBE dividend payers (and growers) have opposite signed equity capital ratios, the parameters that distinguish dividend payers from non-payers and dividendgrowers from non-growers are the same for NBE and PBE firms. Interestingly, this investigation,which focuses specifically on NBE firms, which are typically excluded from dividend policy studies, indicates that NBE firms indeed have a dividend policy, and the dividend policy of NBE firms parallels the dividend policy of PBE firms.

Appendix A Variable Definitions

Variable	Definition
Assets	
TA, Total Assets	Book value of total assets
Cash/Total Assets	Cash and cash equivalents divided by total assets
WC/TA, Working Capital/TotalAssets	Working capital divided by total assets
Net PPE/Total Assets	Net property, plant, and equipment divided by total assets
Net Intangibles/Total Assets	Net Intangibles divided by total assets
Sales/Total Assets	Sales divided by total assets
Asset Growth Rate	(Total assets in year t divided by total assets in year t-1) minus 1
Liabilities	
Total Liabilities	Book Value of total liabilities
TL/TA, book leverage	Total liabilities divided by total assets
Capital	
Total Equity	Book value of total equity
Total Common Equity	Book value of total common equity
Retained Earnings	Book value of retained earnings
TE/TA	Total equity divided by total assets
Earned Capital, RE/TA	Retained earnings divided by total assets
RE/TE	Retained earnings divided by total equity
Preferred Stock	Book value of Preferred stock
Percentage of Firms Financing with Preferred Stock	The percentage of NBE firms in the sample or subset that havepreferred stock included in the book value of total equity
Equity	
Negative Book Equity	Firms with a negative book value of total common equity
NBE firms	Negative book equity firms.
PBE firms	Positive book equity firms
LNBE firms	Large negative book equity firms. Negative book equity firms inthe quartile with the largest magnitude of negative book equity.
SNBE firms	Secondary negative book equity firms. All negative book equity firms except the LNBE firms in the quartile with the largestmagnitude of negative book equity.
HNBE firms	Healthy negative book equity firms. Negative book equity firms with the (H) highest Z-score and firms with medium (M) Z-scores and (H) Tobin's q ratio
ONBE firms	Other negative book equity firms. All negative book equity firms except the HNBE firms.
Profitability	
EBIT	Earnings before interest and tax expenses
EBIT/TA	EBIT divided by total assets
ROA	Return on total assets
Average ROA	Return on total assets averaged over the lesser of the prior 10 years or number of years of SEC 10-k filings.

Appendix A (continued)Variable Definitions

Variable	Definition
Profitability	
ROE	Return on total equity
Earnings Volatility, Standard Deviation of EBIT/TA	Standard deviation of EBIT/TA based on year t and year t-1
Percentage of profitable firms	The percentage of NBE firms in the sample or subset that had positive ROA
Firm Age	
Firm Age	The age of the firm based on the number years from incorporation.
NYSE Percentile	The percentile ranking of firm's market equity. NYSE market equity capitalization percentile breakpoints provided at Dr. Kenneth R. French'swebsite, http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html
Credit	
Z-Score	Altman's Z-score
Interest Coverage, EBIT/Interest Expense	EBIT divided by interest expense
Total Debt Coverage, EBIT/TL	EBIT divided by total liabilities
Investment Grade	Firms with debt rated investment grade
High Default Risk Firms	Firms with an Altman's Z-score below 1.81
Valuation	
EV, Enterprise Value	Enterprise Value, Enterprise value is the sum of the market value of equity plus debt minus cash
EV/Revenue	Enterprise value divided by revenue
ME/TL	Market value of equity divided by the book value of total liabilities
q	Tobin's q. In this paper, q is computed based on the method of Chung and Pruitt (1994)
M/B	Market equity value divided by book equity value
Payout Policy	
Dividend Payers	Firms that pay a regular cash dividend in year t
Dividend Non-Payers	Firms that do not pay a regular cash dividend in year t
Dividend Growers	Firms that pay a greater regular cash dividend in year t than the cash dividend paid in year t-1
Dividend Cutters	Firms that pay a lower regular cash dividend in year t than the cashdividend paid in year t-1
Cash Dividend	Dividends paid to common shareholders in year t, measured as dividendsper share.
Dividend Yield	Annual dividends paid divided by stock price
Dividend Payout	Annual dividends paid divided by the net income to common
Prior Repurchases	A firm that conducted a share repurchase any time in the last 10 years

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THE NEEDED INCREASE OF TAX BASES FOR STATES

Andrew Junikiewicz, Albright College

ABSTRACT

The purpose of this presentation is to discuss the numerous sales tax bases that states have imposed to increase their revenue for their sustainability. Sales taxes are an important and vital revenue base for states to manage their ever-increasing budgets, while trying not to impose an increase in their individual or corporate income taxes. Generally, increasing the individual and corporate tax bases tends to lead to political consequences as well as citizens and companies departing from the state revenue base. This research provides the numerous sales tax bases that states have accepted to increase their revenue base as well as the impact this revenue base has compared to the corporate and individual taxes collected.

INTRODUCTION

It was a beautiful, sunny morning. As I scurried along preparing for the day, I figured I'd quickly jump online to make certain that my paycheck hit our bank account as it does like clockwork every Friday. I was expecting a bonus from the front office for the hard work our team provided with getting a new project off the ground. I was used to having the same amount deposited into our bank account every week, but with the bonus, it would be higher than normal. However, it seemed a little less than I had expected, so I logged into our payroll system to reviewthe deposit advice. As I started scrolling down each line-by-line payroll item, I calculated that anincreased amount of federal taxes was taken out of my bonus, approximately 30%, which seemedvery high to me. Although I believe I am up to speed with my finances, I had not revieed my payroll advice in some time. I continued to review the paystub and quickly remembered that social security and medicare tax is 7.65%, while the state income tax takes 5%, and the local City tax is deducted at 2%. I was actually very surprised at the amount of total taxes I just paid.

I finished getting dressed for work, grabbed my brief case and drove to the office. I stopped at the local coffee shop for a latte and scone, and guess what – paid the 6% sales tax – more moneyfor the government. After a few hours in the office, I grabbed lunch with a colleague and again paid sales tax. After work, I picked up my tickets for the Big Game on Saturday and paid more tax. I went to the local sporting goods store for a t-shirt- more tax, grabbed a bottle of wine – more tax. I quickly remembered that we pay a lot of tax. I then turned on the local news to hearour federal government is looking to increase our tax rates.

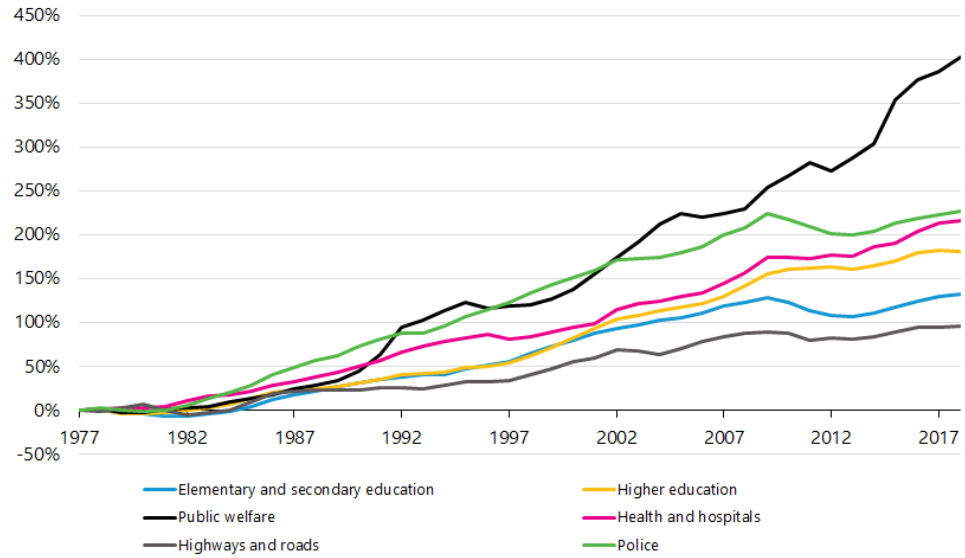
As governments continue to strive to balance their respective budgets, they are continually looking to add new tax bases to increase revenue so they can balance the budget. For the federal,state and local governments, taxes are a significant portion of revenue that is derived from citizens. For state and local governments, income tax and sales tax collectively make up the majority of the revenue collected from citizens. With the cost of these rising expenditures and new programs that state governments want to provide for their citizens, budgets have been on therise. Budgeted expenditures generally go to programs for public welfare, education, highways and roads, corrections, community programs and other items.

As provided in the graph below, over the past thirty years, government expenditures have exploded. The cost of providing public welfare has increased significantly and continues to be funded by the federal government and the taxes collected from income and sales tax, which are generally paid by the citizens. The cost of public education and protection has been on the rise and again is funded by our tax dollars.[1] Since it is difficult to increase the existing tax rates, stategovernments are looking for new tax bases to increase revenue as well as be relevant with the everchanging technology in the current times.

[1] *State and Local Expenditures*, (Urban.org, 2021), www.urban.org/policy-centers/cross-center-initiatives/state-and-local-finance-initiative/state-and-local-backgrounders/state-and-local-expenditures.

State and Local Expenditures

Percentage change in state and local expenditures, fiscal years 1977– 2018



Source: US Census Bureau Annual Survey of State and Local Government Finances, 1977-2018 (compiled by the Urban Institute via State and Local Finance Data: Exploring the Census of Governments; accessed 05-Apr-2021 11:16), https://state-local-finance-data.taxpolicycenter.org.
Note: Percentage changes in direct general expenditures (and all categories) are indexed to 1977 spending. Excludes spending on government-run liquor stores, utilities, and insurance trusts. Medicaid spending is divided between the public welfare and health and hospitals functional categories, with the majority allocated to the former.

URBAN INSTITUTE

Before we take a deep dive into the new tax bases that state governments are transforming into tax revenue, let's review a few standard items in the tax world– from the textbook standpoint. First, the textbook definition of a "tax is a payment required by the federal, state or local government that is unrelated to any specific benefit or service received by the government."[2] Thepurpose of a tax is to raise revenue for the funding of government agencies.

In order to qualify as a tax, the following three requirements must be satisfied:

1. The payment must be required by the government agency;
2. The payment must be imposed by the government agency;
3. The payment is not tied directly to any government agency.[3]

Keep this definition in mind as we review the new tax bases, as some revenue items may seem like a tax but often are not considered a tax. In order to calculate a tax, the simple tax formula isTax = Rate times Base. Tax is equal to the revenue that is derived by the government. The rate is generally set as a percentage amount and the base is the amount of the income, asset, propertyor sales transaction that is subject to the tax by the government agency. This is the standard formula for most federal, state and local governments. For example, the sales tax rate in the Commonwealth of Pennsylvania is 6%. The base, which is subject to the tax, consists of a sales transaction for iPhone. Our formula would conclude that purchasing the iPhone (base) for $1,000at the 6% sales tax (rate) would net a $60 sales tax revenue to the Commonwealth of Pennsylvania.

[2] Benjamin Ayers and John Barrick et al, *Taxation of Individual and Business Entities*, (McGraw-Hill, 2021), 1-23.
[3] Benjamin Ayers and John Barrick et al, *An Introduction to Tax*, (McGraw-Hill, 2021), 1-4.

The second item that needs to be considered with regard to a tax is the political party that residesover the government agency in the present governance. Each of the political parties, Democrat or Republican, has a tax policy or tax agenda. The tax policies vary, depending on the party andthe current economic status, but one thing remains constant – in order for the political candidate to get elected or the presiding leader to get re-elected, the tax policy needs to be considerate to the voting constituents across the nation. With this in mind, politicians generally do not look to raise the tax rate but expand the tax base in order to increase revenue for their government agency. By using this tactic, the politician has a better opportunity for votes with constituents and re-election.

The last item to consider is the changing landscape that technology has imposed on society and taxes for governments. As new businesses, industries and individual preference changes, government agencies need to consider how to include and increase their tax base during these changing times. For example, Amazon has re-defined the consumer purchasing process over thelast decade. Consumers have dramatically decreased the use of malls to purchase goods and have resorted to purchasing goods that get delivered directly to their homes through the global marketplace in which we live. The government agency needs to consider this change from a taxrevenue perspective. Tesla has re-defined the need for automobiles powered by oil products.

Automobiles are now powered by electricity. This reduces the need for oil products. The government agency needs to consider this change from a tax revenue perspective. The pandemichas re-defined the use of commercial office space in which employees need to work and meet to operate and transact business. Employees with the use of their laptop with internet access and Zoom can live anywhere and maintain their career. The government agency needs to consider this change from a tax revenue perspective. Government agencies are consistently adapting to these changing times. They are updating legislation to add new tax bases to increase revenue with these changes, as well remembering not to upset their voting constituents.

Several tax bases have been expanded in the last few years to increase tax revenue while adapting to changing times. Some state governments monitor other states, observing as they addnew bases. If the new base appears to be a draw for constituents, these states will implement legislation to tax the new base within their own state legislation. Three new tax bases that state governments are profiting over the last five years include sales from e-commerce; sales of recreational marijuana, and online and land-based gaming operations. We will explore these new tax bases and the increase in state government revenue these bases have added.

SALE FROM E-COMMERCE

Consumers have dramatically altered their shopping habits from purchasing goods at the localmall to purchasing goods that are delivered directly to their homes through the global marketplace in which we live. Consumers can access the global marketplace at any time and receive the goods within 24-48 hours delivered to their respective home. Companies like Amazon, Ebay and Shopify have re-defined the consumer purchasing process over the lastdecade. Ecommerce purchasing has increased substantially during this period of time.

According to Jilt.com, the total ecommerce sales in the United State in 2010 was $165 Billion.[4] Total ecommerce sales last year have grown to $759 Billion, which is a 460% growth in revenue.Just to put into perspective the immense growth of the global marketplace, Shopify launched its shopping platform in 2006 and within 4 years of operations was providing services to over 20,000 stores with worldwide revenue of $124million.[5] Fast forward eight years later and Shopify was providing services on its platform to over 820,000 stores with revenue of $41 billion. [6] With this growth in the ecommerce space, states were slow to adapt to adding this tax base to their revenue stream.

As you may remember, some of the consumer goods or holiday gifts that you purchased may nothave been subject to sales tax on your particular order. The pair of Nike Air Jordan sneakers thatyou purchased from a vendor in Texas that was delivered to your home in Pennsylvania did not have a sales tax charge on the invoice. This probably occurred as the vendor did not have "Nexus" in your particular state. Since the vendor did not have Nexus, the vendor was not required to collect sales tax. The state governments would be "left in the dark" and not able to collect this revenue.

[4] Sam Greenspan, *The eCommerce decade: How the 2010s changed online shopping* (Jilt 2021), https://jilt.com/blog/decade-ecommerce-2010s/.
[5] Sam Greenspan et al, *The eCommerce decade: How the 2010s changed online shopping*, (2021).
[6] *Ibid* (2021).

Nexus is a term utilized in the sales tax world. It is a connection between a company and the state government in which the company is required to charge, collect and remit a state sales tax ifproducts are shipped to consumers in that particular state, if the company has a physical presencewith employees, inventory or buildings, in that particular state. For example, a business with employee(s), physical office location or inventory only in the Commonwealth of Pennsylvania ships their product to a consumer in the Commonwealth of Pennsylvania, the business would be required to charge, collect a 6% sales tax from the consumer and remit those collections back to the Commonwealth of Pennsylvania. However, if that company in Pennsylvania ships their product to a consumer in Georgia and does not have any employees, offices or inventory in Georgia, then the company would not be required to charge, collect and remit a sales tax to the State of Georgia since the company does not have "Nexus" in Georgia.

As the sales of ecommerce has grown dramatically, states were being bypassed on a substantial amount of sales tax revenue because of this "old" definition of "Nexus." However, in 2018, the State of South Dakota took action and sued ecommerce retailer, Wayfair. This case has re- defined the way sales tax is collected for states and added a new tax base for ecommerce sales tothe tax revenue of state government agencies that impose a sales tax.

In the Supreme Court case, *South Dakota v Wayfair*[7], it was ruled that state government agenciescan mandate that companies be required to charge, collect and remit sales tax even though the company does not have a physical presence in the particular state. There are two factors that a company must now consider when transacting e-commerce business with regard to sales tax. A company must collect and remit sales tax if they either have 200 transactions that are shipped toconsumers in a particular state or $100,000 of sales in that particular state. This Supreme Court decision overturns Nexus rulings from cases reviewed in 1992 and 1967. With this decision andthe quick adoption by state government agencies, 43 of the 45 states have adopted this new legislation and now require remote sellers to charge, collect and remit sales tax respectively.[8]

To put this into a financial perspective for the Commonwealth of Pennsylvania, that Commonwealth collected over $1.3 billion in sales tax from online retailers by adjusting their legislation to this Supreme Court ruling. This has certainly re-defined their definition of Nexus and added a new tax base. This new tax base will provide significant sales tax revenue for years to come. To put this into perspective, Pennsylvania collected $188 million dollars in sales tax revenue just four years prior from online retailers with e-commerce sales.[9] Other states have alsoadjusted to the Supreme Court definition of Nexus and have dramatically increased their tax revenue from this new tax base. The State of Michigan was projected to collect tax revenue in excess of $500 million dollars from e-commerce transaction that were impacted with the Supreme Court decision. The State of Illinois recently implemented this ecommerce sales tax just this year (2021) and has collected over an estimated $150 million dollars in tax revenue fromJanuary through May.[10]

The impact of this new tax base from this legislative ruling has impacted state tax revenue significantly in the last few years. With enhanced technology, growing industry and new consumer trends, state governments have positioned themselves to reap the benefits from this taxbase for years to come.

[7] *South Dakota v. Wayfair, Inc.*, (2018), 17-494.
[8] Jared Walczak and Janelle Cammenga, "State Online Sales Taxes in the Post-Wayfair Era." *Tax Foundation*, 6
[9] Aug. 2020, taxfoundation.org/state-remote-sales-tax-collection-wayfair/.
Jared Walczak and Janelle Cammenga, "State Online Sales Taxes in the Post-Wayfair Era."
[10] Ibid.

SALE OF RECREATIONAL MARIJUANA

As states continually review options to increase their tax revenue, a controversial revenue generator has not gone up in smoke. Recreational marijuana has become a new tax revenue source for states. Colorado was the first state to introduce the legalization of recreational marijuana in 2014.[11] Governor Hickenlooper of Colorado implemented the legislation. It started with a buzz and then highs for the state's tax revenue. As other states watched Colorado increase their tax revenue from marijuana, as well as revenue from licensing fees, other western states jumped on the bandwagon and introduced legislation to legalize recreational marijuana. The other western states that shortly thereafter legalized recreational marijuana included Washingtonand Oregon. Currently, sixteen states (16) have legalized marijuana.[12]

Since the sale of recreational marijuana is a controversial item (and politicians like to receive votes at election time), many states have added this item to an election referendum and let citizens vote. We just witnessed this in New Jersey and New York, which passed the sale of recreational marijuana, based on the votes of the citizens. This enables voters to determine ifthey would agree to this controversial item and enables politicians to blame voters if the itemturns sour.

The table below is based on research that shows different states have varying tax rates to calculate the tax. The tax rate by each individual state ranges from a per ounce tax in Alaska andNew Jersey, 10% in Maine and Michigan, 15% in California, Colorado, Nevada and South Dakota, to the highest tax of 37% in the State of Washington.[13] Compared to other state income and sales taxes that states impose, the recreational marijuana tax is considerably higher than these other taxes.

In reviewing the new base of tax revenue with the legalization of the sale of recreational marijuana, states have raked in significant tax revenues from by this new tax base. For example,Colorado had over $307 million dollars in tax revenue from the sale of recreational marijuana.

This is a substantial monetary figure in tax revenue. Other states are also exploding in tax revenue. Illinois, which just recently passed legislation, is estimated to have tax revenue of over $300 million dollars in this current year. The largest in tax revenue is California. Although it is difficult to compare other states to California with their vast population size and the eighth largest economy in the world, the state had over ½ billion dollars in tax revenue are expected to have a 50% increase in this tax base in the current year. The estimated tax revenue is ¾ billion dollars from the sale of recreational marijuana. Other states are expecting 50-100% increases in their tax revenue compared to the prior year for their new tax base.

Since this is such a controversial subject to many voters, but with the tax revenues being extraordinarily high for this relatively new item, I expect many states and their governing bodiesto add this tax base high on their agenda to help increase their state tax revenues as well as not lose tax revenue to boarding states.

[11] David Murray, "The 'Colorado Experiment': Legalized Marijuana's Impact in Colorado." *The Colorado Experiment*, www.hudson.org/research/17052-the-colorado-experiment-legalized-marijuana-s-impact-in-colorado.
[12] Kurtis Lee, "Here's what Colorado's governor has to tell other states about legalizing marijuana," New York Times, 2016.
[13] Ulrik Boesen, "How High are taxes on recreational marijuana in your state?", Tax Foundation, March 31, 2021, taxfoundation.org/2019-recreational-marijuana-taxes.

State Recreational Marijuana Tax Rates and Tax Revenue[14]:

State	Tax Rates on Marijuana by State	Marijuana Tax Revenue FY 2020	Marijuana Projected Tax Revenue FY 2021
Illinois	7.00%	$ 52,698,873.00	$ 315,645,689.00
Colorado	15.00%	$ 307,278,327.00	$ 410,584,023.00
Nevada	15.00%	$ 105,180,947.00	$ 153,227,327.00
New York*	9% + per ounce		
New Jersey*	$ per ounce		
Alaska	$ per ounce		
Maine	10.00%		
Michigan	10.00%	$ 31,364,000.00	$ 75,000,000.00
Massachusetts	10.75%	$ 51,684,592.00	$ 104,428,106.00
Vermont	14.00%		
South Dakota	15.00%		
California	15.00%	$ 525,943,734.00	$ 757,482,335.00
Arizona	16.00%	$ 24,540,009.00	$ 29,051,904.00
Oregon	17.00%	$ 133,150,349.00	$ 175,106,330.00
Montana	20.00%		
Washington	37.00%	$ 468,502,946.00	Unavailable

We will continue to monitor this new tax base and the tax revenue generated. This will continueto draw a buzz for state governments.

[14] Jeremiah Nguyen, "States Projected to Post Higher Marijuana Revenue in 2021?", Tax Foundation, August 3,2021, taxfoundation.org/states-projected-post-higher-marijuana-revenue-2021

EXPANSION OF GAMING

Gambling and sports waging have a long history rooted in time in the United States. The placesto roll the dice, get 21 or spin the wheel were relegated to testing your luck in Las Vegas or Atlantic City. Other games states' have implemented which fall under the gaming category are state run lotteries. The lottery has always provided the chance of luck to help support a state's elder population and other state programs. Although the revenue generated from the lottery is not considered a tax, the underlying gambling acceptance of the lottery by a specific states' constituents and the amount of revenue the lottery brings into each state has helped pave the way for state governments to include gaming as an additional base. Also, legislation that was passed under the 2018 Supreme Court ruling in Murphy v. National Collegiate Athletic Association relieved the federal ban on sports betting. With the federal relief, twenty states andthe District of Columbia now offer sports betting in their respective states.[15] States have rolledthe dice on adding the gaming and sports betting as an added tax base and it is paying off.

Sports gambling for the past few decades were relegated to the likes of visiting Las Vegas or Atlantic City. As the revenues have continued to grow in the areas, other states provided legislation to make gambling more enticing for their respective state. As other states watched Nevada and New Jersey increase their tax revenue and monetary fees from licensing fees, otherstates, such as Delaware and Pennsylvania, introduced legislation to legalize the gaming industry. As we can see, the tax determined by each individual state ranges from the lower tax rate 6.75% in Nevada and Iowa, to 10% in New York and New Jersey, to the higher tax rates of34 in Pennsylvania and 50% in Delaware

[15]Ulrik Boesen, "Sports Betting Might Come to a State Near You," Tax Foundation, March 3, 2020, taxfoundation.org/legal-sports-betting-states

Tax on Gaming by State (not inclusive of allstates):[16]

New York *	10.00%
Pennsylvania	34.00%
New Jersey *	10.00%
Delaware	50.00%
District of Columbia	10.00%
West Virginia	10.00%
Florida	15.00%
Mississippi	12.00%
Illinois	15.00%
Indiana	9.50%
Kansas*	9.00%
Colorado	10.00%
Nevada	6.75%
Iowa	6.75%
Tennessee	20.00%

[16] Boesen et al, "Sports Betting Might Come to a State Near You."
* Blended Rate based on land based & online revenue

Taking a step back in time, the Commonwealth of Pennsylvania introduced gambling as a tax revenue generator with Act 71 in the mid of 2004. Act 71, also known as the Pennsylvania Racehorse Development and Gaming Act, under then Governor Ed Rendell, paved the way for the introduction of gaming, slot games initially, into the Commonwealth.[17]

From my recollection, I was excited about the new legislation back in 2004 as one of the items promised was the reduction of property taxes for PA citizens. My initial excitement was that thetax revenue from gaming would go toward and eventually eliminate the school tax portion of theproperty tax calculation for landowners. Almost two decades later and a lot of tax revenue to the Commonwealth, my property tax relief was approximately $150 last year! With the new addition of slot gaming and resident gamblers pulling the arms of slot machines, inthe first full year of seven casinos operating, the Commonwealth generated over seven hundred and fifty million dollars in tax revenues from casino gaming. With residents not needing to driveto Atlantic City to test their luck, the slot gaming revenues exceeded the slot gaming of Atlantic City by 2009.[18]

As this tax revenue continued to grow for the Commonwealth, Pennsylvania continued to provide new gambling options in the form of table games, such as blackjack, craps, roulette. These new games provide additional sources of revenue for the casino as well as additional taxrevenue for the state. Additionally, states charge licensing fees that casinos pay to operate.

These licensing fees can be purchased as an all- in-one application for a total of three licenses oras an individual license to operate a specific game. In the Commonwealth of Pennsylvania, thirteen (13) casinos paid the licensing fees which allowed them to operate poker, online slots and online table games[19]. Per our related source, the Live! Casino which is a newly operating casino built near the Philadelphia Sport teams stadiums paid in excess of $74 million dollars inlicensing fees to operate different gaming.[20]

With the wide spread acceptance by the citizens and the tax revenue flowing, states add to their tax revenue by expanding the gaming base. Initially, the slot gaming provided the foundation and was very successful. This success has allowed the state to add additional games to the gaming industry. Our current Commonwealth Governor Tom Wolf added to the gaming base bypassing legislation in late 2017 that allowed gaming to occur online and at public spaces, such asairports, convenient stores and truck stops.[21] This 2017 legislation also enabled the Commonwealth to offer sports betting if and when the federal legislation changed. The federal legislation changed due to a Supreme Court ruling in 2018 and paved the way for sports gamingas another base. New games included table games, such as craps, blackjack and roulette, onlinegames and sports betting.

The States add another stream of tax revenue from these casinos and online gaming sites. The tax rate for online slot gaming is 54%. Table games and online poker have a 16% tax rate. As you can surmise, the casinos certainly pay a hefty tax. Even with this hefty tax rates, the casinos are rolling in the dough (extremely profitable) and certainly not rolling the dice as a business venture.[22]

[17] "Pennsylvania Race Horse Development and Gaming Act" Pennsylvania Gaming Control Board.Retrieved August 2021.
[18] *Wikipedia*, "Gambling in Pennsylvania." Wikimedia Foundation, 28 May 2021, en.wikipedia.org/wiki/GamblinginPennsylvania.
[19] www.playpennsylvania.com/ revenue
[20] www.playpennsylvania.com/ revenue
[21] *Wikipedia*, "Gambling in Pennsylvania." Wikimedia Foundation, 28 May 2021,
[22] www.playpennsylvania.com/ revenue

As new games and gaming opportunities allow state citizens to test their luck, this does offer another stream of tax revenue for the casino and the states. For example, the Mount Airy casinolaunched the first online poker room in November 2019. Two other casinos were licensed and begin offering online poker in April 2021. From the graph, by offering this additional gaming opportunity, the state has generated additional tax revenue in excess of $5M in less than 24 months.

PA State and Local Tax Revenue from(22)						
	Sports Betting	Slot Gaming Tax	Table Game Tax	Total Online Casino Tax	Online Poker Tax	
May-21	$9,988,734	$36,314,428	$5,023,904	$41,338,332	$397,319	
Apr-21	$9,466,734	$33,813,161	$4,429,977	$38,243,138	$370,373	
Mar-21	$10,566,844	$35,869,389	$4,618,108	$40,487,497	$380,001	
Feb-21	$5,896,731	$27,317,041	$3,949,003	$31,266,044	$372,518	
Jan-21	$12,229,342	$27,544,289	$4,268,734	$31,813,023	$433,306	
Dec-20	$12,261,434	$24,973,249	$3,621,244	$28,594,493	$428,103	
Nov-20	$13,446,089	$21,272,654	$2,875,595	$24,148,249	$374,849	
Oct-20	$13,239,693	$21,788,756	$2,718,140	$24,506,896	$387,601	
Sep-20	$2,257,158	$21,565,077	$2,356,890	$23,921,967	$380,167	
Aug-20	$6,578,667	$21,400,525	$2,173,236	$23,573,761	$436,672	
Jul-20	$2,933,093	$21,300,706	$1,907,184	$23,207,890	$477,840	
Jun-20	$2,397,657	$19,858,787	$1,606,208	$21,464,996	$509,590	
May-20	$1,738,436	$21,259,600	$1,987,122	$23,246,722	$729,851	
Apr-20	$1,038,049	$14,755,476	$1,678,339	$16,433,816	$837,550	
Mar-20	$2,480,132	$7,003,614	$1,405,145	$8,408,759	$500,384	
Feb-20	$1,700,011	$5,202,349	$1,284,236	$6,486,586	$290,752	
Jan-20	$8,222,829	$3,883,783	$737,293	$4,621,067	$345,163	(16)

In reviewing the tax revenue dollars in the Commonwealth of Pennsylvania, the tax revenue derived is increasingly dramatically in a year over year comparison. The sports betting tax revenue increased 48% reviewing the months of January 2020 to January 2021, and 246% increase from February 2020 to February 2021. As we can review from the chart, the slot gaming tax revenue is exploding month over month. Rapid growth in tax revenue is alsooccurring with the online casino tax. It is evident that the tax revenue base from gambling has been a true winner for the Commonwealth.

As other states continue to review the developments of the tax bases, it can be assured that theywill follow suit introducing new gaming bases to their states.

Although we discussed earlier that the lottery is not considered a tax, it is an interesting opportunity to review the state lottery and the revenue that is generated by the state. The state lottery does offer one the opportunity the chance to bet $2 and with extreme odds against you buthave the chance to win $100,000. It is intriguing on the human pysch but certainly many people do take the chance. In Pennsylvania, the lottery offers many games of chance throughout the week. I was fascinated in my research after reviewing the financial statements of the Pennsylvania Lottery Bureau not only how much revenue is derived from this chance of luck butalso the sales from the specific games. The lottery brought in over $5 billion dollars of revenue. Profits for the prior year were approximately $100 million dollars. The largest portion of the Lottery's revenue is from scratch off tickets. In my opinion, I was expecting most of the revenue would be from the large payout opportunities like the Power Ball or Mega Millions. In fact, these games derive a small portion of the revenue. The chart below provides a snapshot[23]:

Game:	Revenue (FYE 6/2021)	% of Sales	Revenue (FYE 6/2020)
Scratch Offs	$3,757,858,023	70.87%	3,203,205,926
Draw	$1,345,799.561	25.38%	1,109,852,718
MegaMillions /Powerball	$356,980,138	5.74%	244,009,454
Total Game Sales	$5,302,468,750		$4,469,473,516
Profits	$ 97,375,390		$ 114,225,095
*			

CONCLUSION

As states continue to strive to balance their respective growing state budgets, they are continuallylooking to new tax bases to increase tax revenue. We have reviewed three relatively new tax revenue generators that states are implementing or considering that have explosive opportunities to keep the cash rolling into the states, without the states relying on raising the income tax or sales tax rates. The e-commerce sales tax legislation has been adjusted to meet the increased demand of online shopping and new online business growth in order that states get their appropriate share. The relevant court case and state legislation was enacted just a few short years ago. Many states are legalizing onsite and online gaming as a new tax base. The tax rates are relatively high for casinos but the demand by the citizens and the profitability by the casinos has made this tax base a winner for states. Finally, the legalization of recreational marijuana is high on the agenda of many states as this new tax base does offer some controversial insights but the gains seem to outweigh the negatives, especially on the tax revenue side. State governments are looking at these new needed tax bases to increase revenue for their budgets and to keep up with these fast moving everchanging technological times.

[23] Commonwealth of Pennsylvania -PA Lottery Bureau, Comparative Financial Statements FYE June 30, 2021; June 30, 2020

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TEACHING AND ENGAGING GENERATION Z AFTER COVID-19

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ABSTRACT

As Generation Z (Gen Z) continues to matriculate at colleges and universities, faculty continue to search for ways to engage them in the academic and social dimensions of college to promote student learning, retention, graduation, and job placement. Pre- and Post-COVID literature on Gen Z and pedagogical strategies promote greater use of active learning strategies that are shorter in length, personalized, technology-infused, and social. Peer mentoring programs provide an effective way to socialize new students and integrate learning strategies with these attributes and documented outcomes. This paper provides selected thoughts about supporting Gen Z using a peer mentoring program that was established based on best practices and revised over a six-year period to keep current with student engagement literature and changing student preferences.

INTRODUCTION

As faculty closed out the 2020-21 academic year, they conjured up questions and ideas about what teaching and learning would look like in the post-COVID era. Prior to COVID-19, Generation Z (Gen Z) began to arrive on the doorsteps of employers and post-secondary institutions and now more fully permeates the traditional-age student population layering on another peer group in the multi-generational student body and soon the workforce. Their arrival had evoked questions about how to motivate and instruct this group, but COVID brought its own challenges about how to engage students and rethink teaching and learning. In the wake of this pandemic, what sorts of support should be provided to help these contemporaries connect and establish a sense of belonging to the university, classmates, and faculty? This paper seeks to provide strategies to answer that question.

UNDERSTANDING AND ENGAGING GEN Z

So, who is Gen Z? Cook asserts (n.d.) that Gen Z comprises one of the largest and most diverse generations, marked by curiosity, creativity, problem solving, hope for the future, and aspirations to make a difference. Characterized as being competitive, Gen Z differs from the entitled Millennials, recognizing that their desired outcomes require hard work; they exude progressive, independent, entrepreneurial thinking (Schwieger et al., 2018). As a potential strength, their seamless use of technology creates a blending of the physical and virtual worlds, which could also limit effective communication, relational skills, and willingness to learn from those less tech-savvy (Cook, n.d.; Kaplan, 2017). Predictably, because of the constant toggle between technological devices, Gen Z exhibits weak socialization skills, short attention spans, variant communications (e.g., use of symbols and acronyms), and heavy reliance on technology in all they do (Kaplan, 2017).

Attempts to understand Gen Z revealed ways to reimagine teaching and learning, some aligning with suggestions for fostering engagement in the post-COVID classroom and some echoing long-standing pedagogic principles. Student engagement has garnered considerable attention by academics over the past thirty-some years resulting in a large and varied body of research. The first phases of study can be traced to the works of such authors as Cusick (1973), who described behaviors, socialization patterns, and disengagement exhibited by high-school students and their negative impacts on the students themselves as well as the entire school organization. Similarly, researchers like Chickering and Gamson (1987, 1999), Astin (1984), and Bonwell and Eison (1991) advocated for active learning strategies and robust interaction among faculty and students that engaged students beyond listening to lecture; strategies that evoked student thinking through approaches like discussing, debating, peer evaluating, presenting, and problem solving, among others. Later research by Newmann and associates (1992) redirected intellectual inquiry into student misbehavior and disengagement to the more positive concerns of student engagement in academic work. Newmann defined engagement as the student's psychological investment in and effort directed toward learning, understanding, or mastering the knowledge, skills, or crafts that academic work is intended to promote (p.12).

The works of Cusick, Chickering & Gamson, Astin, and the other notables to be sure, are forerunners to ‘student engagement’ which has become a current focus of attention and produced a vast corpus of discourse on best educational practices to promote active learning, student involvement, student engagement, and ultimately student success (Astin, 1984,1993; Chickering and Gamson, 1987; Kuh, 1995; Kuh et al., 2005; Kuh & Vesper, 1997; Pace,

1995). And, today's research, both pre- and post-COVID, posits student engagement and active learning strategies too, though they may be enmeshed in technology, virtual reality, video, social media, story boarding, games, and other prevailing generational innovations. Alongside the classroom learning strategies, student engagement in academic and social realms may promote learning and involve other methods like enhanced communication and hierarchical and peer mentoring to build connections between students and their discipline, faculty, professionals, and peers.

Discourse on Gen Z preferences suggests that these students desire short segments of various active learning strategies that incorporate technology, visual elements, social dimensions, and personalization. Learning strategies should feature nano-learning methodologies or bite-size approaches to address noticeably shorter attention spans of today's student (Team Linchpin, 2021; Lane, 2020; EHL Insights, 2021). Lane (2020) explains that Gen Z has grown up with immediate access to statistics and facts developing an adept ability to gather and filter volumes of information from myriad sources. This perpetual deluge and sifting of information have diminished attention spans and caused students to rebuff long text and lecture. Teachers are well advised to present material graphically, appealing to Gen Z's visual learning ability, and to chunk subject matter in smaller pieces to make material easier to understand, engage students, and hold their attention (Cook, n.d.; Lane, 2020). Smaller segments that leverage technology and collaborative activities can capture students' interest too (Curtin, 2021).

As the pandemic thrust faculty and students into digital teaching and learning environments, technology became even more central to the process. Oft criticized for its glacial pace of change, educational institutions moved swiftly to transition to virtual learning, and faculty demonstrated flexibility and creativity in using technology to teach and connect classroom learners from a distance (UNESCO, 2020). Technology use for learning in and out of class appeals to Gen Z, makes learning more stimulating, and offers great versatility to pedagogical approaches where active learning can be bolstered (Cook, n.d.). Glantz & Gamrat (2021) assert that technology broadens the teaching and learning space to anytime, anywhere and connects teachers and learners in various ways to communicate, collaborate, and conduct follow-up. It ultimately offers modes for studying individually or working in groups; engaging in class discussion or chatting informally; watching visual content or presenting to others; scanning daily news or filtering research databases; playing learning games or problem solving through social media; and meeting with advisors or mentoring peers.

Technology enriches teaching and learning in infinite ways, and its use is expected. It provides for multiple platforms and means of content delivery allowing students the flexibility to use computers, tablets, or phones as learning tools and addressing different learning styles (Bui, 2020). Gen Z has developed remarkable visual learning abilities and expresses learning preferences of watching YouTube videos, being open to virtual reality, and learning from prompts and forms they can see (Chickovska, 2020). Video-assisted learning can help develop understanding of concepts, cognitive ability, and social-emotional skills and provides real-life learning examples that motivate learning and remain more memorable than text-based approaches (Choi & Johnson, 2005). Learning management systems can archive text, video, audio, and supplemental class recordings to augment class and allow students to revisit material and do self-paced learning (Glantz & Gamrat, 2021).

As Gen Z seeks personalization and relevancy in their educational process, technology invites interaction, creativity, and learning by doing both in and out of class and enables sharing of personalized feedback and guidance (Curtin, 2021; Lane 2020). Artificial intelligence embedded in aids like writing assistants, tutoring systems, virtual facilitators, and presenter coaches provides a means to receive instruction and advice tailored to the individual (Faggella, 2019). Such a range of technology-enabled learning environments allow students to personalize their learning experience and accommodates flexible ways to develop curricula where students participate in directing their own learning experiences (Yerun, 2020).

While technology supports collaboration and interaction, various other active learning strategies infuse a social element and learning by doing which are essential to the learning process and strongly desired by Gen Z (Curtin, 2021; Glantz & Gamrat, 2021; UNESCO, 2020). Astin (1984) suggested that faculty-student interaction characterized by a caring attitude of faculty and staff, translated to a high level of student involvement and thus higher levels of learning, degree completion, and student engagement. Fundamentally, the learning process involves human interaction and years ago, Tinto's (1993) work documented that integration in both academic (the intellectual realm) and social (relationships and connections) dimensions positively influence student persistence and success. In other words, students who engage in academic activities and connect with faculty, staff, and peers will more likely succeed. And, while Gen Z expects faculty to use technology and incorporate student use of technology into learning, research also

suggests that Gen Z prefers in-person activities, face-to-face interaction, group learning, and studying with friends (Chickovska, 2020). Certainly, this affirms the value of collaborative learning approaches where students explore topics that interest them and problem solve, but also supports the benefit of various mentoring programs that can build connections with faculty and peers; offer relevant, personalized guidance; and capitalize on technologies and the broader learning space they furnish.

As we prepare to return to campus following the COVID-19 shutdown, many of the technologies that helped get students through the pandemic, will continue to be an essential part of instructional delivery (Curtin, 2021). While the tech-savvy Gen Z student may not require much encouragement or training in using technology, they may need support when it comes to transitioning back to face-to-face classroom modes, regaining a sense of belonging to the university community at large, and reconnecting with friends, classmates, and faculty. A sense of belonging in their higher education experience is a key determinant of student engagement and performance and the loss of this is what has suffered the most because of the COVID-19 shutdown according to John Hattie of the Melbourne Education Research Institute (Curtin, 2021).

Both in business and education, mentoring programs offer learning opportunities to new arrivals helping them navigate the unknown, adjust to the culture, and understand expectations (Higgins & Kram, 2001). Mentoring programs are valued as a useful tool for enhancing employee and student performance, transferring knowledge from more experienced individuals to less experienced individuals; and retaining employees and students. Hierarchical mentoring generally involves a more experienced mentor paired with an inexperienced mentee; while peer mentoring generally involves a more senior student paired with a less senior student of relatively the same age (Collier, 2017). In business environments hierarchical mentoring practices lead to higher levels of engagement, job satisfaction, and productivity for both mentor and mentee as they often experience an improved sense of personal and professional development, as well as loyalty to the organization (Decaro, 2017). According to the Institute for Higher Education Policy "Mentoring is a valuable strategy to provide students with emotional and instrumental support [they] need to achieve the goal of a college degree… By providing information, guidance, and encouragement, mentors can play a vital role in nurturing students' college aspirations… In addition, mentoring for students in college helps [them] to feel more connected and engaged on campus, which can ultimately improve student outcomes" (Coles, 2011).

PEER MENTORING AS A STRATEGY TO IMPROVE STUDENT ENGAGEMENT

Peer mentoring as a best-practice strategy for promoting student success in colleges and university settings serves an important purpose for the newcomer in successfully overcoming the many challenges presented in being the new kid on the block (Collier, 2017; Ferrari, 2004). The opportunity to be taken under the wing of a senior student can provide a protective shield of support and guidance not otherwise available to the junior student. The supportive relationship between the "mentor and mentee gives the mentee a sense of being connected to the larger community where they may otherwise feel lost" (Best, Hajzler, Ivanov, & Limon, 2008). Providing a structured opportunity to meet and build relationships with more experienced student mentors who can identify with and understand the daily struggles and experiences of being the new kid on campus helps new students become comfortable with campus life and increases student engagement with the university. The benefits are significant and range from students feeling more connected, faster acclimatization to campus life, and improved measures of student success like retention and graduation (Pascarella & Terenzini, 2005; Frieden & Pawelsky, 2003).

A PEER MENTORING APPROACH

The documented benefits of peer mentoring programs inspired the development of a comprehensive approach for first-year students registered in the introduction to business and introduction to accounting classes offered at a public university located in central Pennsylvania. As a follow on to the fall new student orientation, a peer mentoring program was initiated to promote a more positive transition from high school to college. To launch the program, these first-year students were required to attend a scheduled fall student social at which the mentoring program was presented. With faculty supervision, junior- and senior-level students in an introductory human resource management class and an upper-division accounting class organized and implemented the student social. From these

upper-level classes, students volunteered to perform roles as heads of ceremony, hosts, and peer mentors. Business and accounting faculty were highly encouraged to attend and most often participated.

To provide a business-like atmosphere, the social began with students signing in at the registration table and picking up name badges and a printed program agenda. After registration, upperclassmen ushered first-year students into the meeting room and guided them to various activities. The student social format typically included information tables and mixer activities to start; this time provided an opportunity for upperclassmen, club leaders, and faculty to talk casually with students. Upperclassmen staffed the tables which were furnished with information sheets, textbooks, and class work samples, visually showcasing student accomplishments and providing opportunities for conversation and questions. Faculty and upperclassmen represented the various concentrations and talked with first-year students about the major, classes taken and planned to be taken, clubs to join, and helpful hints to navigate campus. During this introductory segment, students informally learned about the majors and concentrations, sat with friends and faculty at small-group tables, gained experience in networking, and completed prepared activity surveys and/or question sheets.

Following this interactive segment, students were greeted with an official welcome and speakers (e.g., guest speaker, upper-division business majors, faculty speaker, clubs and organizations representatives). Acknowledging Gen Z's short attention span, these informational segments were kept relatively short with an itinerary that transitioned at a good pace. The social event culminated with the find-your-mentor activity before closing announcements and adjournment (Grabsch, Peña, & Parks, 2021).

Over a six-year period (2013-2019), the find-your-mentor activity took on different formats to facilitate mentee-mentor pairings based on best practices. Gathering information about career and social interests, personal strengths, and perceived weaknesses can establish a foundation for a good match (Half, 2019). A good mentor-mentee match provides the basis for developing a strong mentor-mentee connection to achieve the goals of the peer mentoring program. In view of this, the first-year students completed a self-assessment and career interest survey two weeks prior to the social event to gather such information and suitably match the mentor-mentee. Upperclassmen taking human resource management also completed the same self-assessment. Faculty categorized survey responses and suggested mentor-mentee pairings. Over the same six-year experiment, different formats for matching included questionnaires, flash mentoring, 10-minute pair-share sessions, search and find games, mentor-mentee bingo, scavenger hunt teams, and structured and/or unstructured interviews. Faculty and upper-division students discussed using self-matching as an option but considered that approach as too threatening for students new to the college environment and discounted that option.

The entire event framework has provided students the opportunity to take part in work-related practices, conduct themselves in a semi-professional manner, practice and develop social skills, and build a professional network by meeting other students in the business program with whom they have not yet connected. These program-induced socialization interactions serve an important function in enhancing the Gen Z students' overall transition to higher education particularly regarding socialization and satisfaction with campus life, degree of student engagement, and overall academic success (Carragher & McGaughey, 2016; Chickering & Gamson, 1987; Kuh, 1993; Pascarella & Terenzini, 1991). While such structured activities can result in a mentor-mentee match, developing a strong mentor-mentee personal connection is necessary to achieve the specific outcomes (DuBois, Holloway, Valentine, & Cooper, 2002), and the peer mentoring program included several activities beyond the student social to this end.

Following the peer mentoring launch at the student social, the pairings completed three to four assignments helping to forge a deeper connection to personalize their learning experience. Over the years, the assignments changed and integrated various technologies like emailing, texting, taking and posting selfies, and Zooming during the pandemic. Generally, the mentor would initiate contact to schedule a meeting. The first assignment included a well-structured email request and response by the pairing. The second assignment may include a face-to-face meeting, taking a selfie, and submitting it to the professor or posting on social media. The third meeting included a face-to-face meeting near mid-semester and next-semester's registration for the mentee to garner mentor advice for course selection. Depending on program events, the mentor-mentee would connect and together attend a business program-sponsored speaker event. Both the mentor and mentee submitted a reflection paper at the end of the semester.

DATA-INFORMED CHANGES

Literature on best practices and Gen Z as well as student feedback informed program changes. Over the years, student feedback led to changing the event from an evening time slot to the mid-day free period to be more convenient for commuter students and minimize evening work conflicts. Following suggestions to chunk material and leverage active learning, the format changed to increase use of shorter segments and interactive activities rather than longer speaker segments that were used when the event was first initiated. Feedback from student leaders led to a new segment called the NewlyED game. Students created a game that paired an upperclassman with a faculty member. The game host asked the upperclassmen to respond to questions about the faculty members (e.g., from where they graduated and what was their hometown). As stated in the literature, students tend to enjoy games, and this one was designed by student request to provide a fun way to get to know program faculty members.

As mentioned in the previous section, over a six-year period, changes in the mentor-mentee matching strategy were undertaken. For example, strategies to facilitate a mentor-mentee match evolved from very structured (assigned matches) to less structured but more creative (game-based). The find-your-mentor strategy was the first and most prominent to undergo revisions. It took different approaches starting with the third annual social in response to negative feedback comments such as “no time to really talk to a "mentor" - too much switching” or “hard to talk to mentors surrounded by others, better if we had started at a table then moved to another table”. This led to devising different means for students to make a mentor match that allowed for them to have more autonomy in finding and choosing a mentee, or vice-versa, in the mentee finding a mentor with whom they would like to connect. In either situation, the matching criteria and method were redrafted and more clearly defined by faculty and the mentor student group. For upper-division students (mentors) taking the human resource management class, this became part of a chapter assignment related to employee-career development and mentoring-socialization.

Lastly, projected changes for the upcoming semester will likely incorporate more technology-based components. The Internet, applications, and various platforms make possible many forms of connection for today’s generations. Text messaging and Facebook are popular, but Instagram, Snapchat, and TikTok continue to climb in popularity with Gen Z as reported by Terry Collins of USA Today and according to YPulse, the leading authority on Gen Z and Millennials (Collins, 2021; YPulse, 2021). E-mail will remain a primary vehicle of communication between mentor and mentee, but other forms of social media and of course means of virtual meetings through Zoom or other platforms will surely make the grade. However, intentional face-to-face components will be vital as we want students in the post COVID era to break out of social isolation and engage, but the program revisions will include blending technology and personal interaction. Integrating these during the fall 2021 planning should help the assignments remain relevant regardless of changes in instructional modalities prompted by upswings in COVID-19 and its variants.

CONCLUSION

Mentoring is a worthwhile strategy to provide students with the emotional and psychosocial support they will need to earn a college degree. Gen Zers see the college degree as a necessary means to an entry-level and long-term career, so it is important that they start and finish their degree program of choice (Chronicle of Higher Education, 2018). The challenges brought on by COVID-19, like the sudden transition to distance learning, prolonged social isolation, anxiety, and depression, are attributed to remote learning and educational uncertainty. These college-going students will need a support system. By providing information, guidance, and encouragement, mentors can play a vital role in nurturing students’ college aspirations, helping them prepare for college, and advising them on how to make successful transitions from high school to their first year on campus (Levine & Nidiffer, 1996). In addition, peer mentoring programs for students (first-year students especially) provide opportunities for establishing an environment where relationships can be fostered helping to build a sense of belonging, confidence, and self-reliance. Students who are mentored tend to feel more connected and engaged on campus, which can ultimately improve student outcomes (Pascarella, 1980; Community College Survey of Student Engagement, 2009).

Students in the business program discussed in this paper report that peer mentoring genuinely seems to help have helped them acclimate to the rigors of college life. So, after six years and counting, the peer mentoring program at this public university will continue with modifications designed to accommodate Gen Z. Primary beneficiaries are the first-year students who stand an improved chance at getting acclimated to their unfamiliar environment. Juniors/seniors who want to develop leadership skills as a mentor to first-year students also benefit greatly. As mentorship is highly valued by both mentors and mentees in professional and educational settings (Erzikova &

Martinelli, 2016) the program will continue to be offered as one of many useful strategies to promote student engagement and support their successful completion of a college degree.

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WECHAT, BUT DO STUDENTS LISTEN?
AN EXPLORATORY STUDY

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ABSTRACT

With the rise in remote learning due to the COVID-19 global pandemic, the need to rapidly find viable technology solutions to connect educators and their students is critical. However, the effectiveness of many new technologies is hindered due to externality issues caused by lack of wide scale adoption and glitches inherent in any immature product. In contrast, WeChat - the highly successful Chinese social media app, is a stable, well established, feature rich software platform with an installed base of 1.2 Billion users. It holds great promise to serve as a viable solution for higher education. In this exploratory study, we describe the development of WeChat and its competitive advantage – Mini Programs. We then present a brief literature review of the many ways WeChat is used in higher Education in China. We then present our survey results, accompanied by an interpretation of the data. We conclude with directions for future research.

WHAT IS WECHAT?

Originally launched in 2011 by the Chinese Internet and Video gaming giant Ten Cent Holdings (Harwit, 2017), WeChat is the most popular social media app in China (Negro, Balbi, & Bory, 2020) .With over 1.25 Billion users (Thomala, 2021), it has permeated all levels of society. The functionality of the WeChat app is far more extensive than its US based equivalents (Chan, 2015). Unlike Facebook Messenger which is primarily text messaging, supplemented with video and audio capabilities (Xie, Putrevu, & Linder, 2017), WeChat combines the features of Facebook, Messenger, WhatsApp, Instagram, Apple Pay (Y. M. Tang, Chau, Hong, Ip, & Yan, 2021), Reddit, and even custom micro-web pages to aggregate information relevant to individuals or groups (Xue, Hu, Chi, & Zhang, 2021).

WeChat Competitive Advantage – Mini Programs

The most distinctive feature and competitive advantage of WeChat in comparison to its US based social media counterparts is WeChat's approach to the creation of ancillary software functionality (Ma, 2019), Unlike the US approach, in which mobile apps must be separately downloaded in both the Android and Apple environments in order to add additional software functionality for the mobile phone user, WeChat instead provides an open source development platform in which software developers can create light apps within the WeChat infrastructure (Hao, Wan, Ma, & Wang, 2018) known as 'Mini Programs' (hereafter MPs) which seamlessly integrate with the functions of the main WeChat app. Thus, WeChat created a unique ecosystem of "apps within an app" (K. Cheng, Schreieck, Wiesche, & Krcmar, 2020). This novel approach brings several major benefits for WeChat users: it bypasses the need to download a new app that may be infrequently used, and thus saves storage on the mobile phone itself. By operating within the WeChat environment, MPs also use fewer phone resources when operating compared with traditional mobile apps (Hao et al., 2018). Most importantly, this "app within an app" approach enables businesses to rapidly integrate their operations into the WeChat ecosystem. Leveraging off of WeChat's core functions of communications, scheduling, and mobile payments (S. Yang, Chen, & Li, 2016). WeChat users, while still within the WeChat app itself, can accomplish critical life tasks like scheduling doctor's appointments and medical care (Luan et al., 2020), and the more mundane bill paying, queuing in restaurants, booking taxis and ride sharing, organizing package deliveries, etc. (Chan, 2015; Z. Tang, Zhou, Xu, & Warkentin, 2021).

WeChat MP's also support Chinese cultural practices, such as the ability to send "digital Red Pockets" (envelope with money) during the Chinese New Year (Y. Xu, 2021). WeChat is also quite popular with travel and leisure (A. Cheng, Renb, Hongc, & Kood, 2019). WeChat is even influencing how traditional Chinese society operates (F. Tu, 2016). For example, when dining gout with friends, it is customary in China to argue (either real or pretend) over who will pay the check in order to save face. With WeChat's mobile payment system, which allows everyone to easily divide up the check and pay their fair share, there are no longer such social (let alone fiscal) concerns (Ghiselli & Ma, 2015). WeChat enables users with similar interests or affiliations (e.g. academic, corporate, civic, etc.) to form ad hoc user

groups to better access both WeChat's core functions of "Chats", "Moments" (photo sharing), "Channels" (TikTok like short video sharing) , in addition to these MP based services (Qiu et al., 2016; "WeChat Features," 2021).

Societal Attitudes

Given that WeChat's early adopters were young people (Yun Chen & Zhao, 2019), the use of this app is especially prevalent among high school and college students in China (Yashu Chen, 2017). The literature reveals studies which reflect both societal and government attitudes and concerns towards these phenomena. Several extant journal articles express concern that excessive use by students may be psychologically damaging. Researchers argue that continuous use of WeChat by college students can diminish their locus of control (J. Hou et al., 2017) as they compare themselves to others they meet online. There is also the potential negative impact on students' in-person friendships (Li, 2020; Pang, 2018b). Others researchers show correlations between anxiety, depression, and the intensity of WeChat use (Gao et al., 2021). All of these undesirable psychological outcomes may be exacerbated by the findings of X. Xu et al. (2016) which show that severe sleep deprivation is common among college age WeChat users. It is no wonder that some researchers even characterize WeChat use by college students as "an addiction" (Zhou & Wang, 2017). Despite these concerns, based on corporate data, there is no doubt that WeChat use will continue:

"Each day, more than 120 million users post in Moments, 360 million users read Official Accounts articles and 400 million users access Mini Programs. SMEs and brands increasingly connect with users via Mini Programs and Weixin Pay, and annual transaction volume generated from Mini Programs more than doubled year-on-year in 2020."
Source: Tencent Holdings 2020 Annual Report

Government Concerns

In the meantime, this explosive growth of WeChat use by college students has not gone unnoticed by the Chinese government. Like many other aspects of Chinese society, there is government oversight of this WeChat app and limitations on public discourse (DeLuca, Brunner, & Sun, 2016). There is extensive research expressing concerns about young people's ability to rapidly disseminate information and potential impact on ideological orthodoxy is in the literature (Yashu Chen, 2017; Harwit, 2017; Linxiao, 2021; Pang, 2018a; Wu & Wall, 2019). Despite these societal concerns, it is clear the Chinese government recognizes the utility of the WeChat platform for online education (R. Hou, Han, Wang, & Zhang, 2021; H. Yang, 2013).

WeChat in Chinese Higher Education

The value of WeChat in education is illustrated not just by the whole scale adoption of the WeChat app by students, parents, and teachers as a flexible communication tool for mobile teaching (S. Tu, Yan, Jie, Ying, & Huang, 2018), but also on the number of scholarly articles examining the use of WeChat for teaching a great diversity of subjects. A short, but representative list includes: reading Chinese literary classics (Yupeng, 2015); designing multimodal foreign language learning (Lei & Liu, 2020); building online communities for teachers (Xue et al., 2021); medical training for both nurses (Zhong-mei, 2015) and physicians (J. Wang et al., 2017); enhancing foreign student engagement (Sun, Smith, & Cowley, 2017); training for dental practices (Zhang, Li, & Li, 2019); innovating mental health education (Tianwei, 2019); education for fine arts majors (Z. Wang, 2018); teaching information literacy (Guo & Huang, 2020) and even learning how to program software (Shang & Qin, 2018).The number of applications for online learning using this WeChat platform truly is endless. In the succeeding portions of this paper, we will now examine the results of survey data from 242 Chinese participants to ascertain how they actually use WeChat.

Survey Construction

In spring of 2020, the third co-author (a student in China) created a Chinese language survey on a public website WJX.cn (the Chinese equivalent of SurveyMonkey.com) at the direction of the second co-author, a Chinese born and educated American professor. Links to this survey were then sent via WeChat to a randomly generated list of participants, derived from these two co-authors' WeChat contact lists. Although the results were anonymous, survey participants were initially asked several self-identifying demographic questions, including city size and occupation (teacher / parent / student, etc.).

As the researchers hoped, the majority of the respondents were students. For all of the ten questions asked, there were

242 valid respondents. Each survey question contained a number of options from which respondents could choose. In four of the questions, (Questions 5, 7, 8, & 9) respondents could choose more than one response option. The rest were single option response questions.

Survey Results and Analysis

The following pages include English language translations of the actual survey instrument, with a table of their results. We follow each question with a brief analysis and interpretation of the question's results.

Survey Question 1: What is your occupation?

Options:	Respondents:	Percentages:
Teacher (please evaluate your students)	6	2.43%
Pupils.	4	1.62%
Middle school students.	9	3.64%
High school students.	71	28.74%
College students.	119	48.18%
Researchers.	5	2.02%
Professional.	18	7.29%
Parents (please evaluate your child)	18	7.29%
Total number of valid respondents.	247	

Over 76% of the respondents were either high school or college students. Since the survey was posted on a public website, in an effort to promote survey participation (as well as conform to Chinese cultural norms), parents were also allowed to participate by evaluating their children's use of WeChat. Fully 7% of the respondents were parents (a cultural phenomenon worthy of further study).

Survey Question 2: Where are you from?

Options:	Respondents:	Percentages:
Super-first-tier cities.	76	30.77%
First-tier cities.	78	31.58%
Second-tier cities.	34	13.77%
smaller cities and villages, etc.	59	23.89%
Total number of valid respondents:	247	

The Chinese city tier system is a hierarchical system of classification of city size based on demographic factors like population, GDP, etc. (Long, 2016). Super First Tier cities include the major coastal cities of Beijing, Shanghai, Guangzhou, and Shenzhen; second tier cites include Kunming, Dalian, and Xiamen. These reference classifications are so commonly used that even multinational firms like Disney consult them in deciding their Chinese sales channel

strategies (Kaminishi, Liu, & Bao, 2020). Once again as the researchers hoped, respondents in the survey were evenly split into thirds of large, medium, and small municipalities, thereby providing a more representative sample.

Survey Question 3: How many hours per week do you typically spend in using WeChat for study?

Options:	Respondents:	Percentages:
Occasional use, with an average of less than 1 hour per week.	55	22.73%
Occasional use, an average of 1-2 hours per week.	64	26.45%
Occasional use, an average of 3-4 hours per week.	48	19.83%
Occasional use, an average of 5-6 hours per week.	18	7.44%
Occasional use, an average of more than 6 hours per week.	13	5.37%
I don't know.	44	18.18%
Total number of valid respondents:	242	

Approximately 7% are heavy users of WeChat for study at 5-6 hours; 20% of the respondents use 3-4 hours a week. 26% use it for 1-2 hours; and 23% for an hour a day or less. Therefore, heavy users of WeChat for academics are in the minority. This is far lower than the researchers anticipated, especially given that participation in the study was through self-selection by students. The results of Question 4 appear to explain Question 3's surprising findings.

Survey Question 4: Have you ever used WeChat platform for course study?

Options:	Respondents:	Percentages:
Yes.	128	51.82%
No (I've studied using other apps or online).	108	43.72%
No (I haven't studied online)	11	4.45%
Total number of valid respondents:	242	

With just slightly over 52% of the respondents stating that they have used WeChat platform for course study (i.e. the Mini Programs), the results of Question 3 become clearer. Among the 242 respondents, the majority have not used WeChat as a learning management platform. These respondents are not like the students in the various WeChat Education research studies described earlier. Among these 242 respondents, no one apparently is training on WeChat to become a dentist, medical doctor, fine artist, or software developer. Which begs the question, how and why are these respondents using WeChat for their studies? The next set of questions flesh these answers out, as well as shed light on some of the users' greatest concerns.

Survey Question 5: What is the most common ways you communicate with teachers and professors?
(Multiple Selections allowed)

Options:	Respondents:	Percentages:
E-mail.	113	46.69%
WeChat	149	61.57%
SMS.	18	7.44%
Mobile phone (voice)	30	12.4%
Other.	27	11.16%
Mixed use, the time difference is not very large.	42	17.36%
Total number of valid respondents:	**242**	

In Question 5, respondents were allowed to make multiple sections (e.g. pick both email and SMS, etc.) when answering how they communicated with their faculty. Therefore, the total sum of responses (379) exceeds the total number of actual respondents (242). A legitimate criticism of this question's methodology is that respondents were not asked to rank their preferred method of communication. Nevertheless, the significant finding is that fully 62% of the respondents indicated that they use WeChat. This number is indicative of its popularity over email, which was selected by just 47% of the respondents. One reason to account for WeChat's popularity is the results of Question 6.

Survey Question 6: With WeChat, do you hear back from your teacher, parent, or others promptly after sending them a message?

Options:	Respondents:	Percentages:
In a timely manner, there will be a reply in a few hours.	92	38.02%
Relatively timely, there is usually a reply. within half a day	126	52.07%
It's not timely, and there's usually a response within a day or two.	19	7.85%
Not in time, it takes more than two days to receive a reply.	5	2.07%
Total number of valid respondents:	242	

With 208 respondents, or 90% indicating that they hear back via WeChat from their instructors within half a day or less, clearly WeChat has advantages over other forms of student/teacher communication. The speed at response may be a reflection of the relative ease at which faculty can reply to their students using mobile phone WeChat versus an academic institution's email server.

Survey Question 7: What are the benefits of using WeChat for class? (Multiple Selections allowed)

Options:	Respondents:	Percentages:
It's convenient for me to communicate with my teacher.	219	90.5% of respondents
It is convenient for me to discuss the problem with my classmates.	161	66% of respondents
It helps me to reduce the time to do my homework.	19	15% of respondents
It helps me improve my study.	38	40% of respondents
Total number of valid respondents:	**242**	

Like Question 5, this question allows multiple selections which accounts for the discrepancies between total number of responses (437) and total number of respondents (242). Despite this methodological short coming, the results are clear: respondents like the ease and convenience WeChat provides in communicating with their faculty (90.5% of respondents) and their classmates (66% of respondents) about problems or issues they have with their studies. This ability for rapid communication results in reducing the time to do homework (15% of respondents) and improves over all study abilities (40% of respondents). Despite these positive findings, Question 8 reveals some disadvantages of using WeChat for academics.

Question 8: What are the disadvantages of using WeChat for school or class? (Multiple selection)

Options:	Respondents:	Percentages:
There are many WeChat groups and lot of information to process, I often feel that I cannot keep up with the pace of the course.	83	34.3%
There's a lot of other content in WeChat that makes it easier for me to get distracted while I'm studying.	176	72.73%
Communicating with WeChat will take me more time.	91	37.6%
My study time is prolonged.	45	18.6%
It doesn't benefit my school grades.	29	11.98%
Other (please fill in)	4	1.65%
I don't feel there is any disadvantage	19	7.85%
Total number of valid respondents:	**242**	

Like Question 5 and 7, this question 8 allows multiple selections without ranking responses. This multi selection accounts for the discrepancies between total number of responses (447) and total number of respondents (242). Despite any methodological short coming by not ranking responses, it is quite clear that WeChat has a major disadvantage: information overload. Fully 73% of respondents state that they can be easily distracted. 34% of respondents feel that they cannot keep up with the pace of the class, given that there are numerous academic related groups, and feel overwhelmed trying to keep up. Considering WeChat is fundamentally a social media platform, these results are not surprising at all. These findings are supported by the earlier cited studies about WeChat usage

by college students and potential adverse impacts on mental health (Gao et al., 2021; Pang, 2018b; Zou et al., 2021). Our final two questions further explored this sense of unease and insecurity, by examining issues of privacy and trust.

Survey Question 9: Are you concerned about your information security in using WeChat to share and learn: Documents or materials you send on WeChat can be seen by people outside the target population or have other privacy disclosures? (Multiple Selections allowed)

Options:	Respondents:	Percentages:
I am worried that WeChat will store and collect my information and learning materials.	105	43.39%
I worry that other students and competitors will be more likely to see and use my information and learning materials.	72	29.75%
I'm afraid my teacher or family will see information and materials that will hurt me.	54	22.31%
I'm not worried, I think WeChat learning is very safe.	85	35.12%
Other.	1	0.41%
Total number of valid respondents:	**242**	

Like Questions 5, 7, and 8, Question 9 also allows multiple selections without ranking responses, which accounts for the discrepancies between total number of responses (317) and total number of respondents (242). Despite this methodological short coming, there are significant privacy concerns. Fully 43% of the respondents worried that WeChat the company would store their information and learning materials. This concern is buttressed by 30% of respondents worrying that competing students will have access to their homework and academic output. Given how competitive Chinese society is in education and trying to secure spots at university, these concerns are well justified. Equally troublesome for respondents (22%) was the fear that family, teachers, or persons in authority would see what they wrote about "in private" to their friends and classmates. And yet, much like social media users in the West, fully 35% of respondents expressed no concern or the safety of WeChat. Question 10 further explored these safety concerns by asking about plagiarism.

Survey Question 10: Have you ever experienced fraud on WeChat, such as plagiarism, academic misconduct, etc.?

Options:	Respondents:	Percentages:
Yes, I've heard of it once or twice.	105	43.39%
Yes, I often hear such news.	36	14.88%
Yes, I or the people around me have experienced it first-hand.	15	6.2%
Yes, I and the people around me go through this from time to time.	7	2.89%
No, I've never heard of or experienced anything like it.	79	32.6%
Total number of valid respondents:	**242**	

Despite 43% of respondents stating that they have occasionally heard of incidents of academic misconduct involving WeChat, and another 15% responding that they often hear of such news, less than 9% report having first-hand knowledge or experience. The remainder (32%) state that they have neither first-hand knowledge nor have heard about incidents of plagiarism, fraud, etc. What is interesting here is to compare and contrast the results of Question 9 with the results of Question 10.

In Question 9, 43% of respondents expressed concern over WeChat storing their data. In Question 10, approximately the same percentage of respondents occasionally heard about plagiarism (43%). In further comparing and contrasting Question 9 and Question 10 results, 35% of respondents are not worried about data security or safety on WeChat in Question 9, and 33% of respondents have not heard nor experienced issues of academic misconduct in Question 10. Apparently, the less cognizant a survey participant is about plagiarism on WeChat, the more confidence the participant has in WeChat's security.

CONCLUSIONS

This short survey of 242 Chinese WeChat users has several limitations. The sample size is relatively small; in multiple selection questions, the responses were not ranked; and the respondents themselves were self-selecting. Nevertheless, several themes do emerge from the data collected. For many WeChat users, the primary value-added feature is the ability to rapidly and efficiently communicate with all classroom stakeholders: teachers, parents, and students. While students appreciate the positive effect ready access to faculty and classmates has on reduced homework prep time, and increased academic performance, they are cognizant of the cost. Students realize that WeChat – like any other social media – can be distracting to their studies. Students are also genuinely concerned about information overload. Given the number of overlapping academic WeChat groups at school, students may struggle to keep up. There is also the potential for privacy infringement, although survey respondents appear to be concerned not just with potential plagiarism, but loss of social standing if their private thoughts are revealed to others. Given the enormity of the WeChat user base, and the continued need for effective online education tools due to the ongoing COVID-19 global pandemic, all of these themes are very much worthy of future research.

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COVID-19, OLDER ADULTS, & MALNUTRITION: THE ROLE OF DIETARY MOBILE APPS

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ABSTRACT

Older adults (OA) are a rapidly growing cohort of the United States (US) population, and malnutrition is one of the most common medical issues facing this population. The COVID-19 pandemic has increased the risk for malnutrition due to social isolation and food insecurity. At the same time, there has been a significant increase with the utilization of digital products and services (De', Pandey, & Pal 2020). This paper explores if mobile apps address the issue of malnutrition and examines, how these apps are tailored to the specific needs of OA and why they may be useful during and after the pandemic. We analyze current nutritional apps, discuss existing challenges, and provide recommendations to improve nutritional outcomes for OAs. Our findings indicate that well-designed mobile apps can support efforts to alleviate malnutrition in OA.

INTRODUCTION

Traditionally, older adults (OA), also referred to as older persons or senior citizens, rely on frequent in-person healthcare visits to ensure health maintenance. However, COVID-19 has altered health care access patterns. The exponential growth of telehealth services during the COVID-19 pandemic has substantially increased reliance on electronic devices to access health care by all age groups. Older adults have been increasingly impacted by the COVID-19 pandemic, and malnutrition is an additional risk factor for developing COVID-19 complications (Mertens & Peñalvo, 2021). Malnutrition is a broad term used to categorize obesity, undernutrition or diet related non communicable diseases, is highly prevalent in OAs, and is not routinely assessed.

In the United States senior citizens (individuals aged 65 and above) are a rapidly growing cohort of society and are expected to reach approximately 98 million by 2060 (Laviano, Koverech, & Zanetti, 2020). As the average life expectancy continues to grow due to reduced mortality, the risk of chronic conditions like malnutrition will continue to rise. The COVID-19 pandemic has magnified the risk due to lack of resources, social isolation, and food scarcity. The staggering numbers of older individuals who have tested COVID-19 positive has led to a substantially higher number of senior citizens who require more resources, and the associated financial burden is likely to exhaust an already resource deficient medical system.

Given the increased needs of healthcare utilization secondary to COVID-19, there is an urgent need to develop robust measures to screen, manage, and monitor key health metrics and prevent unnecessary utilization of healthcare services. The increasingly higher use of technology and telehealth during the COVID-19 pandemic (Wright & Caudill, 2020) has created a unique opportunity to employ innovations like mobile applications to decrease the risks of malnutrition by providing nutritional surveillance, promoting behavior modification, and delivering real-time feedback regarding nutritional needs to OAs.

The advent of information and communications technologies (ICTs) has paved the way for developing innovative tools that may be used for effective and timely interventions regarding malnutrition. Various forms of ICTs used in nutritional assessment and management include eHealth, mNutrition, mAgri, nanotechnology, microassay technologies, and telephone applications. An increasing number of these technologies are used at the individual level and have potential for use in collaboration with healthcare providers.

This study is exploratory in nature, and it focuses on two primary research questions: 1. How can mobile apps be used to address malnutrition in OA? 2. What obstacles would inhibit the use of mobile apps by OA with malnutrition? The motivation for this study is driven by the increasingly higher number of OAs at substantially higher risk of medical complications during COVID-19. We aimed to examine ICTs that may improve the quality of life and health for older persons. Recent studies in this domain have examined OAs and usage of different ICTs, including eHealth, wearable sensors for video gaming, and internet usage (Mather, Jacobsen & Pollard, 2015; Costa & Veloso, 2016; Theis, Schäfer, Bröhl, et al. 2019).

This paper proceeds as follows: first, we define and explain malnutrition as it pertains to older adult's malnutrition. We then use a mini case, that examines the top 25 nutrition apps, and their relevance to addressing the issue of malnutrition in OA. Lastly, we discuss the implications of this study and COVID-19 and propose future directions.

OA, Mobile Apps, and Malnutrition

Mobile phone usage in individuals over 60 years of age has been on a steady increase over the last decade. Recent data shows that 85% of U.S. adults 65 and older have a cellular phone, and 46% of that population has a smartphone (Bouzaabia, Bouzaabia, & Capatina, 2016). Mobile phone applications have also been promoted as therapeutic tools to modify behaviors by using behavior change techniques (BCTs) (Pew Research Center, 2019). BCTs can play a central role in nutritional rehabilitation by serve as a reliable tool to record and disseminate nutritional information to support the healthy nutritional status of OAs by modifying nutrition-related behaviors.

Malnutrition in OAs often goes undiagnosed and leads to longer hospital stays, more frequent infections, and lower risk of healing after injuries (Margetts, Thompson, Elia, & Jackson, 2003; CDC, 2017; Volkert, Beck, Cederholm et al. 2019). About a third of inpatient admissions have malnutrition[11].For adults in the 65-74 age range, 40.2% of men and 43.5% of women are obese. More importantly, obesity-related malnutrition poses a higher risk for the development of COVID-19 related complications as well as chronic illnesses like hypertension, diabetes mellitus, cardiac problems, and certain forms of cancers. Most OA have a strong desire to maintain independent living habits and enjoy their personal freedom (Schoeppe, Alley, Rebar et al. 2017). Innovations like mobile applications targeting essential nutritional information for OA can help them maintain a degree of freedom by facilitating nutritional support. Education and monitoring via mobile applications can play a vital role in preventing malnutrition particularly during COVID-19 related mandated social restrictions. Furthermore, mobile phone applications, when used effectively, can help OA develop healthy living habits to decrease the risk of morbidity or out of home placement.

For OAs, there is a negative correlation between memory loss and quality of life (Volkert, Beck, Cederholm et al. 2019). The age-related cognitive decline characterized by memory loss and reduced mental capacity can be very impairing (Margetts, Thompson, Elia, & Jackson, 2003). It may lead to forgetfulness about meals and dietary intake, loss of ability to prepare meals or buy nutritionally efficacious groceries. Mobile phone applications can provide consistent push notifications and recipes designed by dieticians can be integrated into a user-friendly interface to improve the engagement of the user (CDC, 2017).

Feedback provision is another significant benefit derived from the use of mobile applications which pertains to the COVID-19 era. The data gathered by the user's mobile phone application can be presented to healthcare providers during telehealth visits, eliminating the need for retrospective recall of nutritional intake. Ideally, the data should be transmitted directly to healthcare providers for timely feedback, but this is an advanced function and may require federal HIPPA (health insurance portability and accountability act) compliance for implementation.

BCTs can be implemented through the effective use of mobile applications (Pew Research Center, 2019). However, evidence-based behavioral techniques require ongoing consumer engagement for successful implementation. Research on the cellular phone-based medical informatics (CPBMI) has shown that they are effective, and they can aid in the management of preventable health issues such as malnutrition, without compromising the individual's independence (Ahn, Kwon, & Kang, 2020). Developing mastery over the skills to maneuver mobile dietary applications can promote self-actualization processes (Mol, Carpay, Ramakers et al., 2007). Reinforcement of positive behaviors using mobile applications can decrease sense of loneliness stemming from COVID-19 mandated social restrictions and engage OAs in their health maintenance.

Mobile applications are a relatively new technology that has grown exponentially from 178 billion downloads in 2017 to a projected 45% increase to 258 billion downloads by 2022 (Harman & Martín, 2020). Historically, apps have been classified in terms of their functionality, such as those designed for gaming, social media, business functions, entertainment, travel, banking, fitness, or nutrition. Nutrition apps, grouped under the larger category of health and fitness apps, represented the 8th most downloaded category of apps in 2018 (Mauch, Wycherley, Laws et

al., 2018). Even though the overall category of nutrition apps is comparatively small, we expect there will be an upward trend due to an increased focus on nutrition, aging, and the prevalence of chronic illnesses since the advent of COVID-19 pandemic.

For an OA, there are distinct utilitarian benefits from using mobile apps such as reminders for medicines and meals; monitoring nutrient intake; and documentation that can be easily shared with healthcare professionals. In addition to utilitarian values, there are also hedonic benefits such as engagement with friends and family (Theis, Schäfer, Bröhl, et al. 2019), gaming, or enjoyment derived from the interactive nature of the apps which may decrease sense of social isolation because of COVID-19 pandemic.

NUTRITIONAL APPS – MINI CASE ANALYSIS

To examine the role of nutrition apps, we performed a systematic mini case analysis of the top 25 nutrition apps (Table 1). Of the 25 nutrition apps examined, 30% used an image (without text) as the user interface. Standardized brand logos facilitate a better evaluation of and adaption to the product (Kim, Lee, Kim, & Kim, 2014). To analyze the qualitative data of the nutrition apps, we created a word cloud based on all the app descriptions (Figure 1). The topmost frequently represented terms were weight, app, healthy, food, and fitness.

Figure 1: Key Terms in Nutrition App Descriptions

Of the 25 apps examined, 100% of them were available for download on iOS devices, and 88% of them were available on Android devices, with 80% of all apps having a free download. Approximately 76% of the apps examined had subscription fees for more advanced features or paid options to remove ads. This is a common pricing structure used with apps to generate revenue and to give the consumer added value when using the product. From a rating perspective, there were ratings for both Android and iOS apps. However, downloadable information was only available for Android apps; there was no downloadable data available for iOS apps. None of the apps indicated any special designation for OA or for prevention, treatment, or management of malnutrition. However, the term nutrition was one of the top 10 terms used in the app descriptions.

Table 1: Summary of Nutrition Apps Profile

App Name	Available on Android Devices (Y/N)	Android Downloads	Android - Star Rating (1-5)	Available on iOS Devices (Y/N)	iOS - Star Rating (1-5)	Free Download (Y/N)	Cost (Purchase and/or Subscription)
8fit Fitness at Home	Y	10,000,000+	4.6	Y	4.7	Y	$4.99 - $60.00
FatSecret	Y	10,000,000+	4.5	Y	4.7	Y	$6.99 - $44.99

FitMenCook	Y	500,000+	4.8	Y	4.9	N	$3.99
Fitocracy	Y	100,000+	3.4	Y	4.2	N	$4.99
FoodPrint	Y	10,000+	3.5	Y	-	Y	-
Fooducate	Y	1,000,000+	4.4	Y	4.7	Y	$1.99 - $69.99
HealthifyMe	Y	5,000,000+	4.6	Y	4.3	Y	$0.99 - $69.99
HealthyOut	Y	-		Y	3.7	Y	-
KetoDiet	Y	10,000+	3.0	Y	4.4	N	$1.99 - $8.99
Kurbo	Y	10,000+	3.5	Y	4.5	Y	-
Lifesum	Y	10,000,000+	4.4	Y	4.8	N	$3.33 - $52.56
Locavore	N	-	-	Y	1.3	Y	-
LoseIt!	Y	10,000,000+	4.4	Y	4.7	Y	$4.99 - $189.99
MyDietCoach	Y	10,000,000+	4.4	Y	4.6	Y	$3.99 - $32.99
MyFitnessPal	Y	50,000,000+	4.6	Y	4.7	Y	$0.99 - $49.99
MyNetDiary	Y	1,000,000+	4.5	Y	4.7	Y	$5.00 - $40.00
MyPlate Calorie Tracker	Y	1,000,000+	4.6	Y	4.6	Y	$9.99 - $44.99
Noom	Y	10,000,000+	4.2	Y	4.6	Y	$0.99 - $199.00
Nutrients	N	-	-	Y	4.2	N	$4.99
PlateJoy	Y	10,000+	4.3	Y	4.3	Y	$69.00 - $99.00
Rise	N	-	-	Y	4.1	Y	$14.99 - $89.99
ShopWell	Y	100,000+	3.6	Y	4.7	Y	-
Shopwell	Y	100,000+	3.6	Y	4.7	Y	-
Sparkpeople	Y	1,000,000+	4.5	Y	4.6	Y	$4.99 - $29.99
Waterlogged	Y	50,000+	3.5	Y	4.3	Y	$2.99

CHALLENGES OF USING MOBILE APPLICATIONS FOR MALNUTRITION IN OA

Results from our mini-case analysis showed that nutrition apps had no specificity toward OAs. Despite the widely held notion that OAs are resistant to the use of mobile devices and mobile applications, they should not be treated as a homogenous group ((Mol, Carpay, Ramakers et al., 2007). Furthermore, there is convincing evidence that with minor training and repeated use, OAs experience a decline in the level of anxiety related to these technological advances and can overcome their negative perceptions regarding technology. COVID-19 has enabled a quick adoption of technology in all age ranges as evidenced by increased internet service usage creating an opportunity for promoting healthy behaviors via mobile apps.

Lack of uniform standards also create an additional challenge as mobile apps use varying methods to collect data about user's dietary intake. Many applications gather a narrow range of inputs like food intake or caloric intake instead of using broader, more evidence-based parameters like body mass index, activity levels, and dietary habits. These apps tend to gather limited information focused primarily on macronutrients, and hence, insufficient information is available to share with healthcare providers (Plaza, Martín, Martin & Medrano, 2011). One study concluded that approximately 70% of mobile nutrition applications did not contain a food diary, a critical element involved in the understanding and management of malnutrition (Statista, 2021).

Well-built data monitoring and detection systems can be a major benefit of nutritional applications, but accurately recording required information and linking it to healthcare providers remain an operational challenge. This lack of integrative capacity is a major drawback of these applications and requires modification to ensure timely detection and management of malnutrition. As the applications are unable to readily export data, the healthcare providers lose

the opportunity to provide timely and individualized management plans. A critical element in nutritional rehabilitation and prevention of malnutrition is personal goal development and acquisition of feedback regarding current dietary practices which is impossible in the absence of integrative capacity.

Cybersecurity threats also pose a challenge against the effective utilization of mobile applications and impact their use for research purposes. A recent report stated that only 3% of the mobile phone applications have reasonable security features (Plaza, Martín, Martin & Medrano, 2011). There are also HIPAA (Health insurance portability and accountability act) implications if the data collected from mobile apps is to be shared with healthcare professionals. This can lead to legal and ethical issues regarding terms of usage, privacy, anonymity, especially for the use of data in research studies. This is further exacerbated due to a lack of consistency and standardization with the collection and utilization of mobile app data.

Variations in the quality and functionality of the mobile devices creates another challenge. The availability and functionality of apps can vary across diverse mobile platforms. From a device perspective, minor and seemingly inconsequential issues like small text size, or type of font, can be challenging for OAs who struggle with age-related decreased hearing, impaired vision, motor deficits and lack of mobility (Clement, 2020; Mol et. al 2007). These factors combined with age related cognitive decline can hinder OA's adoption of mobile technologies and warrant attention.

DISCUSSION

COVID-19 has transformed our social lives and access to healthcare. The exponential increase in internet and internet service usage has created new opportunities for gathering and reporting healthcare data. Telemedicine has become a norm and will continue beyond the COVID-19 era. While the pandemic has wreaked havoc globally, it has had differentially negative outcomes for the elderly. The increased demands on healthcare facilities necessitate promotion of preventative health measures to minimize comorbid risk factors. Previous literature supports the notion that mobile healthcare apps have the potential to improve health outcomes in OA (Lee, 2019). Our analysis pertaining to mobile app usage in OA identified opportunities and challenges that may impact the elderly. Based on our findings, it is pertinent to report two categories of recommendations: technical and behavioral.

From a technical perspective, there is an opportunity to tailor more app solutions targeting older individuals as our results from our 25 nutrition apps show a limited or non-existent focus on the OA population. Specific solutions like the use of large icons, large fonts, and clearly distinguishable colors are relatively minor technical modifications with positive impact for OAs. Less use of blue is also recommended since retinal aging can lead to difficulty in perceiving blue. Selected use of medical jargon can also make a considerable difference and help improve the adoption and use of mobile nutrition apps by the OA. Artificial intelligence (AI) is an integral component driving innovation in the healthcare domain.

Global spending on AI in healthcare is increasing, with overall AI and cognitive systems spending expected to reach almost $78 billion by 2022 (Maringer et al., 2018). AI could be used to develop and propose personalized but easy to understand meal plans to ensure adequate nutritional intake derived from evidence-based professional recommendations. Voice-based virtual assistants such as Amazon Echo and Orbita health are using AI to engage users and promote treatment adherence. Creative user-friendly development and effective use can help improve healthcare outcomes in this unique cohort of the population.

From a behavioral perspective, COVID-19 has increased the use of mobile devices as a solution to access healthcare data in a cost-effective manner. The training usually required to adopt and utilize a new technology for this behavioral shift has naturally taken place due to COVID-19 as OAs are more comfortable using electronic devices. A main challenge for healthcare professionals will be finding the app that is most appropriate for user needs in compliance with the medical and ethical standards.

Despite the known benefits of mobile healthcare applications, the data regarding their impact on specific behaviors and nutritional improvement is scarce. There are numerous health-related apps but their impact on detection, management and prevention of malnutrition is largely unknown. The development of mobile phone applications targeting malnutrition in OAs carries many healthcare and economic benefits including opportunities to educate users, minimize risk of malnutrition and monitor complications pertaining to COVID-19 specific risks in obese or frail OAs.

CONCLUSION

COVID-19 has unique implications for older adults. The social isolation, food scarcity, and chronic medical issues increase risk of malnutrition in older adults during the pandemic. Mobile applications have potential as user friendly tools to monitor, promote and improve outcomes for malnutrition particularly during COVID-19 pandemic. However, currently there is limited focus from developers regarding OA specific nutrition apps. OA specific nutrition apps can help close the resource gap arising from lack of in person check-ins, higher risk of COVID-19 complications and malnutrition risk in a rapidly growing aging population in a cost-effective manner. The current trend of using mobile devices to access and report healthcare data during this pandemic is poised for continued innovation and growth as OAs are becoming increasingly comfortable using these devices. Mobile application targeting nutritional status of OAs can mitigate negative outcomes of malnutrition, improve quality of life, and reduce healthcare costs resulting from malnutrition during and after the COVID-19 pandemic era.

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POLITICALLY CONNECTED DIRECTORS AND CORPORATE GOVERNANCE

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ABSTRACT

Research has shown that firms can benefit when they are politically connected. The extant literature has shown that politically connected firms benefit from procurement contracts, reducedregulatory issues and lower costs of capital. However, with more politicians joining corporate boards, the effect of political connectedness on corporate governance remains unclear. This paper examines the association between politically connected directors and corporate governance. A sample of high-ranking politicians that have joined firm boards of directors is examined. I find that firms with politician directors have higher corporate governance scores. Additional tests also indicate that an addition of a politician to a board of directors increases the quality of governance.

INTRODUCTION

Politicians often have the power and influence to benefit corporations. In 2007, Tenet Healthcare was suffering through regulatory and reputational problems, when it decided to appoint former Governor Jeb Bush and former Senator Bob Kerrey to its board of directors. By 2009, the corporation was the second-best performing stock on the S&P 500 for the year and hassince become one of the largest healthcare companies in the United States (Krantz, 2010). In contrast, in the midst of the Chesapeake Energy scandal—where the company failed to disclose the CEO's questionable financial practices—were two powerful ex-politicians. Senator Don Nickles and Governor Frank Keating enjoyed several perks, such as access to the firm's private planes for travel, while failing to maintain their fiduciary duty (McIntyre & Zajac, 2012).

However, while more attention is paid to scandals regarding governance failures, these directorswere likely an anomaly compared to the many politicians sitting on boards that bring value to firms. Thus, this paper empirically examines the association between politicians on corporate boards and corporate governance.

Academics, the business media and governance experts have started to take a closer lookat ex-politicians sitting on corporate boards. While there has been an increasing amount of literature recently regarding politically connected firms, the extant literature has tended to focuson countries with underdeveloped financial markets or in highly corrupt political environments. However, political figures, albeit often retired from public office, being nominated to board positions in the United States is becoming more common. Politicians identified in this paper arethose that have sat on high level public positions, such as former presidential candidates, senators, congressmen, big city mayors, governors, secretaries, and ambassadors. These politicians are independent directors and are less likely to have direct business connections than other outside directors.

To date, the extant literature on director nominations often takes a resource dependence view (Pfeffer & Salancik, 1978). The board of directors can be viewed as a linking instrument between the organization and the external environment. Political leaders (who can be classified as community influence type directors) often have different background than other types of board members (business experts/insiders, support specialists). However, these politicians share many of the same traits, skills, and previous job experiences as other corporate directors. These directors are often high profile and have been shown to help business procure government contracts, reduce borrowing costs, and allow firms to benefit from becoming more tax aggressive(Chaney et al., 2011; Goldman et al., 2013; Kim & Zhang, 2016).

Data was collected comes from management information circulars (proxy statements), Compustat, CRSP and ISS/RiskMetrics, for the years 2007 to 2012. 6372 firm-years are examined and show that 29% of listed firms in the sample have or had at least one politician on its board of directors. Furthermore, these politically connected firms tend to have different firm and governance characteristics than their counterparts. However, there is little difference in their performance characteristics.

Utilizing the Entrenchment Index (Bebchuk et al., 2009), this paper hypothesizes and finds that firms with politician directors are associated with higher corporate governance scores.This relationship persists after controlling for firm-level, performance, and other governance-based variables. The paper also documents that firms which add former politicians to their boardof directors improve their corporate governance quality. Dropping politicians from boards

has minimal or a negative effect on governance quality. Additional testing, including a propensity scoring matching model and difference-in-differences, provide support for these hypotheses.

This paper contributes to the corporate governance literature and to the diverse research field of politically connected firms. To the best of the author's knowledge, this is the first paper to examine the connection between politicians as directors and corporate governance quality, using a relatively large sample size. While previous literature has focused on the performance effects of being politically connected, this paper finds that adding politicians to corporate boards can also be an effective governance mechanism.

The rest of the paper is organized as follows: The next section presents background information regarding boards of directors and political connections. Hypotheses development is described in the third section. Section four outlines the research methodology. Results are reported in the fifth section. Section six provides additional testing. The final section of the paperconcludes the study.

BACKGROUND

Prior Literature on Politically Connected Firms

Watts and Zimmerman's (1978) influential paper on Positive Accounting Theory put forward the political cost hypothesis. Their model demonstrated that firms may use accounting methods to lower profits so as not to attract the attention of politicians. Shleifer and Vishny (1994) put forward an alternative model where politicians will extract rents from politically connected firms. Firms are able to enhance their value when the benefits of these connections outweigh their rents (costs). However, when there is the potential for political exploitation, firms often can take steps towards mitigate these risks, such as hiring high quality auditors (Gul, 2006).

Much of the extant literature has examined firms with political connections in emergingor corrupt markets, often in both. These studies have mainly focused on politician ownership of firms or politicians in high management positions, with only a few focusing primarily on the board of directors. Furthermore, these papers tend to focus on countries with underdeveloped financial markets or in highly corruption political environments (Carretta et al., 2012). For instance, in emerging markets and highly corrupt countries, Faccio et al. (2006) find that firm value increases when an entrepreneur is elected to a top political position. Asian studies have shown that politically connected firms are often given special privileges by the government (Effiezal Aswadi et al., 2011). In recent years, a number of studies have examined the political connectivity of Chinese firms since the country's move towards privatization. Fan et. al. (2007)find that politically connected CEOs have poorer post-IPO stock performance and that these firms are more likely to appoint other bureaucrats, rather than directors with relevant professional backgrounds, to the board of directors. Private Chinese firms with politically connected managers are more likely to obtain government subsidies (Wu et al., 2012), are morelikely to expropriate from minority shareholders (Cheung et al., 2010; Qian et al., 2011) and areless likely to be forced to resign than poorer performing state-owned firms (Chang & Wong, 2009).

In the United States, it is rare for an active or former politician to obtain control of a corporation or the CEO position in a firm. However, politicians being nominated to board positions is becoming more prevalent. Politically connected firms are most likely to occur in regulated industries (Agrawal & Knoeber, 2001). At the same time, these companies often need to improve their accounting transparency and are more likely to hire a Big Four auditor (Guedhami et al., 2014). Additional studies on politically connected firms have shown that thesefirms are more likely to receive corporate bailouts and more preferential treatment in procurement contacts (Faccio et al., 2006; Lenway & Rehbein, 1991).

However, few papers have examined how politician directorships affect the corporate governance of firms in developed markets. A seminal study in this literature by Goldman et al. (2009) did find that politically connected director nominations are associated with significant cumulative abnormal returns (CARs) in the United States, although the study focused mainly onCARs around the time of presidential elections. Nonetheless, both Republican and Democratic affiliated board nominations were found to have significant effects. Other papers on politically connected firms have shown that political connections, and especially politically connected directors, can be extremely beneficial to firms. Hillman (2005) finds that firms with ex- politicians on the board of directors are

associated with better market-based performance, especially in heavily regulated industries. Similarly, the cost of bank loans is significantly lowerfor companies that have board members with political ties (Houston et al., 2014).

Director Nominations

Since Fama and Jensen (1983) a great deal of research and regulation has focused on the board of directors, as they play a vital role in monitoring management, setting policies and reducing agency conflicts. Rather than just playing an advisory role, directors are often needed to facilitate better access to important resources in the firm's external environment (Pfeffer, 1972). This includes providing direct connections to important stakeholders (Mizruchi, 1996) such as creditors, customers and the government. Furthermore, board members are often nominated as a means for a firm to gain legitimacy. Thus, firms tend to hire high profile directorsas a credible signalling mechanism to the market (Deutsch & Ross, 2003).

Directors are often nominated by the nominating committee of a board, although CEOsoften have a considerable amount of influence over the process (Zajac & Westphal, 1996). To ensure the quality of the board, directorships are recommended to be staffed with independent, experienced and knowledgeable members (Vafeas, 1999). Once a nomination is made, shareholders then ratify director candidates selected by the board itself. Director nomination candidates are rarely voted down by shareholders, unless there is an ongoing proxy battle - often caused by institutional investors (MacGregor & Campbell, 2008). Furthermore, it has been notedthat directors can be categorized into four types: insiders (e.g. current or former firm executives),business experts (e.g. CEOs or directors of other firms), support specialists (e.g. lawyers and bankers) and community influencers (e.g. political leaders and university faculty) (Hillman et al.,2000). Thus, unlike the first three categories where the directors often have significant business experience, politicians are nominated for alternative reasons.

HYPOTHESES DEVELOPMENT

Resource Dependence and Other Theories

The board of directors can be seen as a linking instrument between the organization and the external environment. Resource dependence theory is often employed in political connectedness research to explain why firms become politically connected and nominate former politicians to their boards. Resource dependence theory, as posited by Pfeffer and Salancik (1978), argues that interdependent relationships are needed by organizations in order to both reduce uncertainty and enhance power. To minimize conflicts, an organization will often nominate a representative of the source of the constraint onto its governing board. Although the organization might forgo some of its autonomy, an individual appointed to a board is expected tosupport and aid the organization in its problems (Pfeffer & Salancik, 1978).

Based on resource dependence theory, Kim and Zhang (2016) show that politically connected firms, including those with politicians as board members, are associated with (and benefit from) tax aggressiveness. Likewise, Chaney et al. (2011) find that while the cost of debt is higher for firms with lower quality reported earnings, politically connected firms are able to report poorer quality earnings without a negative effect to their cost of debt. Thus, the academic literature has begun to demonstrate that nominating politicians to the board of directors can be anefficient strategy for enhancing corporate outcomes.

Other theories have also been proposed to explain the emergence of politically connected firms. Agency theory deals with potential conflicts between political directors and management (e.g. Ellstrand, et al., 2002; Lee. et al., 2014). Embeddedness theory takes an economic- sociological perspective in studying inter-organization costs and constraints when politicians are involved (Siegel, 2007; Okhmatovskiy, 2010). Exchange theory in this literature describes the interdependence of suppliers and demanders of public policy (Schuler et al., 2002). Finally, somestudies have taken more of a philosophical approach, such as a Confucian perspective for political appointments (Li & Liang, 2015) or ethical perspectives, such as how political connections relate to corporate social responsibility (Li & Zhang, 2010).

Former Politicians as Corporate Directors

Successful high-level politicians share many of the same traits as corporate directors. Namely, their job requires them to be accountable (both professionally and legally) and be performance orientated along with having strong leadership, decision making, and communication skills (Romzek, 2000). Moreover, previous government experience allows them to provide valuable advice and counsel regarding the public policy environment of a firm. This includes, "channels of communication to existing government officials, bureaucrats, and other political decision makers; influence over political decisions; and legitimacy" (Lester et al., 2008). Moreover, politicians are independent directors and are less likely to have direct business connections than other outside directors. These directors also have a high reputation to keep and,with their public profiles, are more likely to be scrutinized than other directors—incentives to avoid poor governance practices.

Directors are directly linked with the setting, monitoring, and reviewing of all top-level corporate policies and decisions. The argument can be made that firm performance is positivelyassociated with good corporate governance quality (Gao, et al., 2016; Gompers et al., 2003; Ueng, 2016, among others). Nonetheless, the aforementioned literature generally suggests that politicians on boards of directors *do* benefit corporations in multiple ways. For example, studies of the university faculty, the other community influencer type of director, have shown that professors in the boardroom have positive effects on the corporate governance of firms (Franciset al., 2015; Huang et al., 2016).

As resource dependence theory suggests, firms will bring in resources, such as directors, to manage uncertainty, especially when dealing with governments or regulators (Pfeffer, 1987). The aforementioned extant literature demonstrates that politicians are an effective human resource, especially when dealing with government intervention or regulatory issues- which high level politicians often have a comprehensive understanding on the policy and regulatory processes. Ex-politicians as directors are an important source of human and social capital (Lesteret al., 2008) and are known to provide firms with important expertise on legislative and bureaucratic procedures (Goldman et al., 2009). Furthermore, these politicians have the knowledge and experience on how to appease constituents (a.k.a. shareholders). Thus, the hypotheses are provided in alternative form:

H1: Firms with former politicians on their board of directors are associated withhigher quality corporate governance.

H2: Firms that add former politicians to their board of directors improve theircorporate governance quality.

METHOD

The data collected in this paper derives from management information circulars (proxy statements), Institutional Shareholder Services (ISS)/RiskMetrics, Compustat and the Center for Research in Security Prices (CRSP) databases. Prior studies have utilized various measures and model specifications to measure political connectedness. For instance, campaign contributions, lobbying expenditures, or authors have created their own political alignment indexes. Here, onlyboard members with prior political experience are examined, as directors are directly linked withthe setting, monitoring, and reviewing of all top level corporate policies and decisions.[1]

The sample begins with all firms that contain data from 2007 to 2012 in ISS. Firms thatdo not have the necessary information in ISS/Riskmetrics, proxy statements from EDGAR (the Electronic Data Gathering, Analysis, and Retrieval system) or Compustat are removed due of insufficient data. Similarly, trusts, which have different governance structures, and governmentsponsored entities (such as Fannie Mae), which are politically connected by design, were takenout of the sample. This left a total of 6372 firm-year observations. The detailed sample description is presented in Table 1.
[See Table 1]

Politicians are identified by the Goldman et al. (2009) method via a textual analysis. Proxy statements for all of the firms in the sample are downloaded from EDGAR and entered into a java-based program co-developed by the author.

[1] This is one of the most popular measures of political connectedness (see. Goldman et al., 2009; Duchin & Sosyura, 2012; Kostovetsky, 2015).

Next, all of the proxy statements are analyzed and a company is classified as politically connected if it has at least one board memberwith one of the following former positions: president, presidential (vice-presidential) candidate, senator, member of the House of Representatives, (assistant) secretary[2], deputy secretary, deputy assistant secretary, undersecretary, associate director, governor, director (CIA, FEMA), deputy director (CIA, Office of Management and Budget), commissioner (IRS, NRC, SSA, FDA, SEC),ambassador, mayor, White House staff, chairman of the presidential election campaign, and chairman or member of the president's council. During this process, each result was manually checked (by reading through the proxy statement) to determine whether or not the result was referring to a director's past position.

To test whether these firms also have provisions that enable them to be entrenched, Bebchuk et al.'s (2009) Entrenchment Index[3] (E Index) was utilized.[4] The E index is a subset ofGompers et al.'s (2003) Governance Index (G Index), based on what Bebchuk et al. (2009) identified as the six most important corporate governance items. These six corporate governanceprovisions that determine whether a board is entrenched are: a staggered board, limits to amend bylaws, limits to amend charter, supermajority voting rules, golden parachutes and poison pills. All of the governance provisions are provided in the ISS/RiskMetrics data and the E Index is calculated from there. Prior studies that have used the Entrenchment Index as a proxy for corporate governance have shown that firms which score higher on the E Index are associated with lower creditor ratings, excessive CEO compensation, tax aggressiveness and lower firm valuations (see Alali et al., 2012; Brown & Caylor, 2006; Francis et al., 2013; Hoppe & Moers,2011; Skantz, 2012; Veld & Wu, 2013).

The following regression was then performed:

$E\ Index_{it} = \alpha 0_{it} + \alpha 1 PoliticianOnBoard_{it} + \sum Controls_{it} + \mu_{it}$ *Eqn. (1)* where Entrenchment Index is the dependent variable and lower scores suggest higher corporate governance quality.

Rather it is a corporate governance concept that focuses on (poor) alignment between management and shareholder interests.

Characteristics of the Board

Various studies have examined the corporate governance effects of age and other board composition variables. Hunt and Jennings (1997) show that younger aged managers tend to makethe most unethical decisions. Similarly, older, more educated and female managers are found to be more ethical than their counterparts and may reduce firm level risk (Deshpande, 1997). CEO age is also positively associated with financial reporting quality (Huang et al., 2016), although CEOs acquire more power over time by participating in the appointment of board members and once they pass their first five years in office, their dismissal likelihood declines (Shen & Cannella, 2002). Kim and Zhang (2016) note that firms with politicians as board members often pay less taxes.

[2] All secretary positions refer to federal executive departments of the United States

[3] As posited by Manne (1965) and Shleifer and Vishny (1989), management entrenchment occurs when management and the board are given the power to make firm- level decisions that decreases the likelihood of being forced to vacate their position. This includes protecting against mergers, acquisitions, hostile takeovers or other events that may disrupt their power. Shareholders may be harmed by management shirking, empire-building or extraction of benefits such as higher compensation. Entrenchment is known to cause agency problems with negativevaluation consequences (Zerni et al., 2010). However, entrenchment is not necessarily associated with CEO tenure, as many long tenured executives hold on to their positions due to valid reasons, such as superior performance.

[4] This study utilizes the E Index as a proxy for corporate governance quality and does not attempt to make a direct connection between political directors and management entrenchment.

Older directors on the audit committee are negatively related to the cost of equity capital (Dao et al., 2013). However, Ali et al. (2014) found mixed results when testing between board age diversity and performance. When prior firm performance is better, the former CEO is more likely to be retained on the board (Evans et al., 2010). Finally, busy and long tenured directors may be associated with governance problems (Niu & Berberich, 2015).

Controls in this study include: *Size,* which is measured using the natural log of the total assets of a corporation. *ROA* measures the return on assets for the firm in the current year. *Book-to-market* is calculated as the book value of equity, excluding preferred shares, divided by the market value of the firm on the balance sheet date. *Leverage* is measured as a firm's total debt divided by its total assets. *Firm Age* is measured as the number of data years (as a public company) available on CRSP.[5] *Cash Effective Tax Rate* is calculated as the amount of tax paid incash divided by the firm's net income. *GAAP Effective Tax Rate* is also run as a tax avoidance substitute for *Cash ETR*. Other governance variables related to the structure of the board are alsocontrolled for: *Board Size* measures the size of the board of directors, divided by the natural log of the total assets. *Independent Chair* is also a dummy variable, with a value of one if the chairman of the board was independent from the CEO and zero otherwise. *Female Directors* measures the percentage of directors on the board that are female. *CEO Age* is the age of the chief executive officer on the proxy statement date—including *Young CEO* if the CEO is younger than fifty years of age and *Old CEO* if the CEO is sixty years of age or older—while *CEO Tenure* is the number of years as chief executive officer on the same date. *Directors' Average Age* measures the average age of all the directors (endogeneity testing is done to measure the average age without the politicians and/or CEOs). Finally, *Busyness* or busy directors measures the average number of other public directorships per board member.

A similar regression to Eqn (1) is then performed to determine whether there are any incrementaleffects from adding or dropping politicians from the board of directors:

$$E\ Index_{it} = \alpha 0 + \alpha 1 PoliticianOnBoard_{it} + \alpha 2 Add\_politician_{it} +$$

$$\alpha 3 Drop\_politician_{it} + \sum Controls_{it} + \mu_{it} \qquad Eqn.\ (2)$$

where *Add_politician* is an indicator value of one if a politician has been added to the board of directors, zero otherwise and *Drop_politician* is an indicator value of one if a politician has beendropped from the board of directors, zero otherwise. All non-indicator variables are winsorized at the 1% and 99% levels for the two equations. Finally, to address the issue of independence in time-series data, robust standard errors are required. Thus, the regressions are run with standard errors clustered by firm.

[5] The CRSP database only goes back to 1925. 34 (3.2%) of the firms in the sample have the maximum value of 82-87 years. The results are unchanged when the natural log of firm age is substituted.

RESULTS

Table 2 shows the distribution of politicians over the 2007-2012 sample periods.

Approximately 24% of the firms had at least one politician on its board of directors. The numberof politically connected firms, and total number of politicians on boards, increased by about five percent over the sample period. Table 3 presents the descriptive statistics for the sample. Panel Aprovides the descriptive statistics for all the firms in the sample. Additional analysis shows that approximately 29% (304/1062) of the firms in the sample had a politician on its board of directors for at least one of the sample years. Descriptive statistics in Panel B show firms with political directors have higher corporate governance (lower Entrenchment Index scores).

Consistent with the extant literature (e.g. Kim & Zhang, 2016), these firms are also significantly larger than firms without a former politician on its board of directors. The "political firms" are significantly older, have larger boards as well as retain a higher percentage of female directors. *Politician on Board* firms are more likely to be audited by the Big 4 versus the control group (consistent with Guedhami et al., 2014). Furthermore, the "political boards" are older, but with directors having shorter average tenures on those boards, and with outside directors hold significantly more other directorships. Finally, consistent with Faccio (2010) and other studies, it was found thatpolitically connected firms are more leveraged than non-politically connectedfirms.

[See Table 2]

[See Table 3]

Table 4 presents the correlations matrix. The maximum correlation is between *Size* and *Board Size* at 0.625, while the minimum correlation is between *ROA* and *book-to-market* valuation at -0.58. Consistent with expectations, *Politician on Board* and the *E Index* are negatively correlated ($p < 0.01$). The E Index is positively correlated with a larger *Board Size* and a higher *book-to-market* valuation. It is negatively correlated with *Size*, older firms, return onassets, *Female Directors*, and *Director Tenure*. Meanwhile, *Politician on Board* is positively correlated with both firm *Size* and *Board Size*, along with *Firm Age*, higher *Leverage*, *Female Directors*, older CEOs, longer tenured directors and *Busy Directors*. *Politician on Board* has a negative correlation with a higher *Book-to-market* valuation, independent chair, younger CEOs and *Director Age*.[6]
[See Table 4]

Table 5 presents the results of the regressions. The base model is shown in the first column, followed by *Eqn (1)* in the second column and *Eqn (2)* in the third column. The base model shows that there is a significant negative relationship ($p < 0.01$) between the E Index and*Politician on Board* (once again a lower index score shows higher governance quality). The fullmodel shows that this significant relationship persists ($p < 0.05$) after controls are added. This isconsistent with H1 (firms with a politician on the board of directors have superior corporate governance quality). The final column shows the incremental effect of adding or dropping politicians from the board of directors. There is a significantly negative ($p < 0.05$) relationship between the *E Index* and *Add_politician*, while there is no significant relationship between the *EIndex* and *Drop_politician.* This provides some evidence to support H2 (adding a politician to the board improves governance quality).

[6] Also of note, the *E Index* has a very strong positive correlation with the *G Index*. This alternative index is explored further in section VI Additional Testing.

The firm level variables show that larger firms have significantly lower governance scores (higher *E Index*), while higher leveraged and larger firms have significantly higher corporate governance scores (lower *E Index*). This is consistent with the notion that larger firmsare under more scrutiny and more leveraged firms are riskier. Similarly, higher *Book-to-Market*firms (lower market valuation) are positively associated with the *E Index*. As can be expected when it comes to governance quality, the governance variables show that larger boards have significantly more entrenchment provisions, while boards with an independent chairperson haveless provisions/higher governance scores. Finally, boards with older (on average) directors havesignificantly lower corporate governance quality.
[SeeTable 5]

ADDITIONAL TESTING

Propensity Score Matching

Following Armstrong, Jagolinzer, and Larcker (2010), an ordered logistic-propensity score model was run, which models the probability that the *EIndex* will be affected by whether a firm has *Politicians on Board*. Matched pairs are formed by selecting an observation politically connected firm and matching it with a non-politically connected firm with the closest propensity score, based on size, industry and year, from the control group. This is performed with no replacement. Results are presented in Table 6. Similar to the ttest and the other linear models, the average treatment effect (ATT) of adding a politician to the board of directors shows a negativerelationship between *Politician on Board* and the *E Index*. A regression run with the matched pairs also documents this relationship ($p < 0.05$). This provides additional support for H1.
[See Table 6]

Difference-in-Differences

A difference-in-differences design is also used to analyze the comparisons of the *EIndex*around the year of an additional or withdrawal of a politician to a company's board of directors.Here the control firms are those that have not added (or dropped) a politician to its board of directors from 2008-2012. Table 7 reports mean values of across the baseline (2007-2011) and follow-up periods (2008-2012). During the sample period, 117 firms added a politician to its board, while 92 politicians were dropped from boards of directors. Panel A shows that there is asignificant governance quality increase (lower score) in the *EIndex* after a politician joins a board. Meanwhile, Panel B shows that there is a significantly governance quality decrease (higher score) in the *EIndex* after a politician is dropped from a board. This provides additional support for H2.
[SeeTable 7]

Governance Index as a Lagged Indicator

To address the possibility that politicians on board effect future governance quality, thefollowing regressions were also run:

$$E\,Index_{it+1} = \alpha 0_{it} + \alpha 1 politicianonboard_{it} + \sum Controls_{it} + \mu_{it} \qquad Eqn.\ (3)$$

where the *Entrenchment Index* is now one year forward. Table 8 presents the results. The results are consistent with the main regression. The negative relationship between the *EIndex* and *PoliticianOnBoard* is still significant ($p < 0.05$), once again, implying higher governance quality. This provides support for both hypotheses.
[SeeTable 8]

Endogeneity Testing

Distance to Washington, D.C. is often used as an instrumental variable in the political connections' literature (for example Houston et al., 2014; Kim & Zhang, 2016). *DistanceDC* is measured as the natural logarithm of one plus the distance from a firm's headquarter to Washington, D.C. There is no reason that this excluded variable would have a direct impact on the *E Index.* A Heckman two-stage regression and a two-stage least squares regression are run and the second stage results are presented in Table 9. The Heckman two-stage regression shows that the IV for *PoliticianOnBoard* is still significant ($p < 0.05$), however none of the variables aresignificant in the two-stage least squares model.
[SeeTable 9]

Alternative Governance Index Measures

In Bebchuk et al. (2009), the authors measure the entrenchment index both as a raw scoreand as an indicator variable. Consistent with their approach, Eqn. (1) is rerun with a logistic regression. In this model a firm has a value of 1 if the *E Index* is equal or greater than two. The results are presented in Table 10. The results show that *PoliticianOnBoard* has a significant negative relationship with the *E Index* ($p < 0.01$), providing additional support for H1. The rest of the results are essential the same as the main regression, except for three variables (*Book-to- market, IndChair and Director's Age)* which show lower significance.
[See Table 10]

As an alternative to the *E Index*, Gompers et al.'s (2003) (G Index) is utilized. The G Index identifies 24 governance provisions that proxy for shareholder rights. These are sorted into five categories: 1) Delay (provisions intended to delay hostile takeover bidders); 2) Voting (provisions dealing with shareholder voting rights); 3) Protection (provisions protecting directorsand officers); 4) State (state takeover laws); and 5) Other (provisions related to takeover defenses). Prior studies that have used the Governance Index as a proxy for corporate governance have shown that firms that score higher on the G Index are associated with earnings management, higher underwriting fees, less investment in R&D and reduced capital expenditures, and an increased risk of default (see Cao et al., 2015; Chakraborty & Sheikh, 2010; Jiraporn et al., 2008; Lin & Ulupinar, 2013). The score is calculated from the ISS/RiskMetrics data and the regression is clustered for standard errors. The G Index is substituted for the E Indexas follows:

$$G\ Index_{it} = \alpha 0_{it} + \alpha 1 politicianonboard_{it} + \sum Controls_{it} + \mu_{it}\ Eqn.\ (4)$$

Table 11 presents the results of this regression. Although the two indices are significantlycorrelated with each other, the negative relationship documented by *Politician on Board* and the *G Index* is not significant here. One possible explanation is provided by Bebchuk et al. (2009), which states that the *G Index* has several unnecessary provisions. Similar to the main models, there is a positive association between both *Leverage* and *Board Size* with the index. Unlike the previous models, *Female* and *Busy Directors* are positively associated with the *G Index*.
[SeeTable 11]

CONCLUSION

Prior research has shown that politically connected firms help business procure government contracts, obtain financing, and allow firms to become more tax aggressive. Formerpoliticians joining corporate boards have been linked to abnormal positive stock returns, reduced borrowing costs and overall increase market based performance. Nevertheless, the associationbetween politician directors and corporate governance remains unclear.

This paper hypothesizes and finds that firms with politician directors are associated with higher corporate governance scores. This relationship persists after controlling for firm-level, performance, and other governance based variables. A propensity scoring matching model and employing the index as a lagged variable confirms the results. Difference-in-differences regressions show that adding a politician to a board of directors is positively associated with governance quality, while dropping a politician from a board of directors is negatively associatedwith governance quality. Causality cannot be implied since the antecedents and determinants of why firms hire politicians are not empirically tested in this paper. However, the results, combined with the extant literature, do imply that successful politicians as directors enhance.

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Table 1: Sample Description

Number of firm-year observations from ISS/RiskMetrics	8815
Less: Firms with missing data	(1555)
Less: Trusts and government sponsored entities	(192)
Less: Firms with missing EDGAR or Compustat data	(696)
Final Sample	6372

Table 2: Politicians by Year

Year	# of Firms with Politician on Board	% of Firms with Politician on Board	Total # of Politicians on Boards
2007	241	22.7%	320
2008	246	23.2%	323
2009	254	23.9%	337
2010	262	24.7%	350
2011	255	24.0%	339
2012	253	23.8%	335

Table 3: Descriptive StatisticsPanel A: Entire Sample

Variable	Mean	Min	25%	Median	75%	Max
Politician on Board	0.237	0	0	0	0	1
GIndex	7.329	0	6	7	9	16
EIndex	2.643	0	2	3	4	6
Size	8.204	5.079	6.989	8.037	9.285	12.710
Firm Age	29.684	1	15	24	40	87
Leverage	0.556	0	0.405	0.558	0.704	0.998
Big4	0.985	0	1	1	1	1
ROA	0.040	-0.345	0.014	0.047	0.085	0.560
BKMK	0.628	-0.011	0.325	0.513	0.777	2.129
Cash ETR	0.227	0	0.067	0.217	0.327	1
Board Size	9.561	4	8	9	11	18
IND Chair	0.479	0	0	0	1	1
Female Directors	0.127	0	0	0.110	0.200	0.570
CEO Age	57.039	35	52	57	61	91
CEO Tenure	9.840	1	4	7	13	39
Directors' Age	62.279	46	59.9	62.4	64.6	77.9
Directors' Tenure	9.118	1	6.5	8.5	11	20.7
Busy Director	1.065	0	0.5	0.8	1.2	2.6

Panel B: Differences between Politician on Board and No Politician Firms

Variable	Politician on BoardMean (n=1511)	No PoliticianMean (n=4861)	T-test betweenGroups
Gindex	7.279	7.488	-2.49***
EIndex	2.493	2.689	-4.74***
Size	9.094	7.927	24.34***
Firm Age	36.267	27.637	14.91***
Leverage	0.614	0.537	11.27***
Big4	0.985	0.938	7.36***
ROA	0.048	0.037	1.35
BKMK	0.583	0.643	-2.19**
Cash ETR	0.228	0.226	0.40
Board Size	10.525	9.261	18.44***
IND Chair	0.393	0.506	-7.70***
Female Directors	0.145	0.121	8.35***
CEO Age	57.367	56.938	2.10**
CEO Tenure	9.604	9.914	-0.34
Directors' Age	63.166	62.003	10.72***
Directors' Tenure	8.704	9.247	-3.82***
Busy Director	1.065	0.784	19.74***

*** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% levelSee Appendix I for variable descriptions

Table 4: Correlations Matrix

	gindex	eindex	politi~d	nlsize	firmage	leverage	roa	bookto~j	cashetr	boards~e	indchair	female~s	youngceo	oldceo	direct~g	avgyea~e	busyness
gindex	1																
eindex	0.7444*	1															
politician~d	-0.0385*	-0.0616*	1														
nlsize	0.1204*	-0.0969*	0.2803*	1													
firmage	0.0208	-0.0329*	0.1303*	0.3428*	1												
leverage	0.1369*	0.0149	0.1514*	0.5338*	0.1992*	1											
roa	-0.0565*	-0.0668*	-0.0069	-0.1349*	-0.0167	-0.3800*	1										
booktomark~j	0.0051	0.0457*	-0.0474*	0.0905*	0.0309	0.0554*	-0.5826*	1									
cashetr	0.0178	0.0267	-0.0024	-0.0752*	-0.0411*	-0.1432*	0.3420*	-0.1637*	1								
boardsize	0.1646*	0.0472*	0.2277*	0.6251*	0.3531*	0.4062*	-0.0974*	0.0535*	-0.0239	1							
indchair	-0.0275	-0.013	-0.0960*	-0.1288*	-0.1191*	-0.0710*	-0.0296	-0.0018	-0.016	-0.0422*	1						
femaledirectors	0.0540*	-0.0486*	0.1186*	0.2807*	0.1833*	0.2474*	-0.0166	-0.0556*	0.0015	0.2835*	-0.0516*	1					
youngceo	-0.0067	0.0203	-0.0403*	-0.0957*	-0.1551*	-0.0718*	0.0347*	-0.0632*	0.0408*	-0.0805*	0.1710*	-0.0327*	1				
oldceo	-0.0166	-0.0112	0.0325*	0.0275	0.0894*	-0.0226	-0.006	0.0563*	-0.0026	0.0366*	-0.2216*	-0.0733*	-0.2803*	1			
directorsag	-0.0451*	-0.0423*	0.137*	0.0788*	0.19*	0.0123	-0.028	0.0903*	-0.0042	0.1004*	-0.0615*	-0.1642*	-0.2420*	0.3137*	1		
avgyearsof~e	-0.0792*	-0.0315	-0.0786*	-0.1067*	0.1378*	-0.1040*	0.0285	0.0315	0.015	-0.0377*	-0.0376*	-0.1708*	-0.1105*	0.1741*	0.4256*	1	
busyness	0.1324*	-0.0219	0.2393*	0.3485*	0.2013*	0.1332*	0.0821*	-0.1563*	0.0153	0.2361*	-0.0507*	0.1782*	-0.0199	-0.0316	-0.0142	-0.2753*	1

* Significant at the 1% level
See Appendix I for variable descriptions

Table 5: Regression Results

Variable	OLS Coefficient(t-stat) EIndex	OLS Coefficient (t-stat) EIndex	OLS Coefficient (t-stat) EIndex
Politician on Board	-0.196*** (-2.72)	-0.170** (-2.31)	-0.154** (-2.04)
Add_politician			-0.202** (-1.97)
Drop_politician			-0.100 (-0.83)
Firm Level Variables			
Size		-0.198***(-7.50)	-0.198***(-7.47)
Firm Age		-0.001 (-0.40)	-0.001 (-0.37)
Leverage		0.651***(4.12)	0.649***(4.11)
Performance BasedVariables			
ROA		0.207 (0.73)	0.203 (0.71)
BKMK		0.180***(2.62)	0.179***(2.62)
Cash ETR		-0.072 (-0.70)	-0.074 (-0.70)
Other GovernanceVariables			
Board Size		0.095***(6.20)	0.096***(6.24)
IND Chair		-0.101**(-1.96)	-0.102**(-1.97)
Female Directors		0.313 (1.12)	0.306 (1.09)
Young CEO		-0.003 (-0.04)	-0.002 (-0.03)
Old CEO		-0.050 (-0.93)	-0.049 (-0.91)
Directors Average Age		0.025***(2.66)	0.024***(2.64)
Directors' Tenure		-0.005 (-0.51)	-0.005 (-0.53)
Busy Director		-0.006 (-0.09)	-0.006 (-0.10)
Industry Effects		Yes	Yes
Year Effects		Yes	Yes
Observations	6372	6372	6372
Adjusted R^2	0.001	0.4135	0.4139

*** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level, two-tailedtests. See Appendix I for variable descriptions

Table 6: Propensity Score Matching

Variable	Sample	Treated	Controls	Difference	t-stat
EIndex	Unmatched	2.495	2.689	-0.194	-4.69***
	ATT	2.507	2.558	-0.122	-2.57**

Variable	OLS Coefficient(t-stat)
Politician on Board	-0.119**(-2.20)
Firm Age	-0.004***(-2.95)
Leverage	-0.198
	(-1.36)
Performance BasedVariables	
ROA	
	-2.522***(-5.48)
BKMK	-0.115
	(-1.54)
Cash ETR	0.404***(2.95)
Other GovernanceVariables	
Board Size	
	0.026**(1.99)
IND Chair	-0.121**(-2.18)
Female Directors	0.471**(2.23)
Young CEO	0.099
	(1.63)
Old CEO	-0.069
	(-1.64)
Directors Average Age	0.080***
	(12.00)
Directors' Tenure	-0.039***(-6.11)
Busy Director	0.367***(8.60)
Observations	3010
Adjusted R²	0.0204

*** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level, two-tailedtests. See Appendix I for variable descriptions

Table 7: Difference-in-Differences

Panel A: E-Index, Politician Added to Board

	Baseline	Follow-up	Diff-in-Diff(t-stat)
Control Group *N=6249* (No Politicians Added)	2.522	3.298	
Treatment Group *N=117* (Politician Added to Board)	2.177	2.333	
Difference (T-C)(t-stat)	-0.345**(-2.44)	-0.965***(-3.18)	-0.619*(-1.85)
R^2	0.04		

Panel B: E-Index, Politician Dropped from Board

	Baseline	Follow-up	Diff-in-Diff(t-stat)
Control Group *N=6274* (No Politicians Added)	2.524	3.277	
Treatment Group *N=92* (Politician Dropped fromBoard)	1.987	3.400	
Difference (T-C)(t-stat)	-0.537***(-3.40)	0.123 (0.34)	0.092*(1.69)
R^2	0.04		

*** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% levelSee Appendix I for variable descriptions

Table 8: Additional Regression ResultsDV =E Indexit+1

Variable	OLS Coefficient (t-stat) EIndex
Politician on Board	-0.182** (-2.34)
Firm Level Variables	
Size	-0.207***(-15.14)
Firm Age	-0.001 (-1.52)
Leverage	0.628*** (7.35)
Performance BasedVariables	
ROA	-0.066 (-0.31)
BKMK	0.202*** (4.68)
Cash ETR	0.020 (0.26)
Governance Variables	
Board Size	0.090***(6.31)
IND Chair	-0.114**(-2.07)
Female Directors	0.410 (1.37)
Young CEO	-0.016 (-0.19)
Old CEO	-0.053 (-0.89)
Directors Average Age	0.026*** (2.62)
Directors' Tenure	-0.005 (-0.48)
Busy Director	0.005 (0.08)
Industry Effects	Yes
Year Effects	Yes
Observations	5305
Adjusted R^2	0.3831

*** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level, two-tailedtests. See Appendix I for variable descriptions

Table 9: Endogeneity Testing

Variable	Heckman(z-stat) EIndex	2SLS (z-stat)EIndex
Politician on Board	-0.036**	6.498
	(-2.49)	(0.41)
Firm Level Variables		
Size	-0.255***(-9.78)	-0.512
		(-0.67)
Firm Age	-0.002	-0.044
	(-1.62)	(-0.40)
Leverage	0.144	0.769
	(0.79)	(1.47)
Performance BasedVariables		
ROA	-1.390***(-2.74)	0.629
		(0.51)
BKMK	0.100	0.563
	(1.11)	(0.60)
Cash ETR	0.091	-0.197
	(0.61)	(-0.50)
Other GovernanceVariables		
Board Size	0.081***(4.84)	0.021
		(0.12)
IND Chair	-0.186**(-2.95)	0.169
		(0.25)
Female Directors	0.053	-0.286
	(0.15)	(-0.18)
Young CEO	0.151	-0.174
	(1.49)	(-0.38)
Old CEO	-0.115*	0.002
	(-1.77)	(0.01)
Directors Average Age	0.026**	-0.105
	(2.39)	(-0.34)
Directors' Tenure	0.017**(1.74)	0.063
		(0.38)
Busy Director	0.065	-0.690
	(0.93)	(-0.42)
Industry Effects	Yes	Yes
Year Effects	Yes	Yes
Observations	6372	6372
Wald chi²	1109.08	2268.20

*** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level, two-tailedtests. See Appendix I for variable descriptions

Table 10: Logistic Regression Results

Variable	OLS Coefficient (t-stat) EIndex
Politician on Board	-0.368*** (-2.66)
Add_politician	
Drop_politician	
Firm Level Variables	
Size	-0.342***(-6.27)
Firm Age	-0.001 (-1.46)
Leverage	1.011*** (3.03)
Performance BasedVariables	
ROA	0.093 (0.11)
BKMK	0.289* (1.69)
Cash ETR	-0.100 (-0.40)
Other GovernanceVariables	
Board Size	0.135***(4.28)
IND Chair	-0.147 (-1.32)
Female Directors	0.488 (0.78)
Young CEO	0.018 (0.11)
Old CEO	-0.071 (-0.62)
Directors Average Age	0.044** (2.21)
Directors' Tenure	-0.018 (-0.91)
Busy Director	-0.018 (-0.14)
Industry Effects	Yes
Year Effects	Yes
Observations	6372
Pseudo R²	0.2340

*** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level, two-tailedtests. See Appendix I for variable descriptions

Table 11: G-Index

Variable	OLS Coefficient (t-stat) GIndex
Politician on Board	-0.129 (-0.92)
Firm Level Variables	
Size	-0.053 (-0.99)
Firm Age	-0.002 (-0.65)
Leverage	1.189*** (3.76)
Performance BasedVariables	
ROA	0.015 (-0.04)
BKMK	0.163 (1.24)
Cash ETR	-0.138 (-0.67)
Governance Variables	
Board Size	0.135***(4.46)
IND Chair	-0.119 (-1.17)
Female Directors	1.367** (2.45)
Young CEO	-0.093 (-0.65)
Old CEO	-0.078 (-0.78)
Directors Average Age	0.029 (1.57)
Directors' Tenure	-0.002 (-0.10)
Busy Director	0.394*** (3.22)
Industry Effects	Yes
Year Effects	Yes
Observations	6372
Adjusted R^2	0.3047

*** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level, two-tailedtests. See Appendix I for variable descriptions

Appendix I: Variable Definitions

EIndex- Entrenchment Index, corporate governance measure of how many entrenchment provisions a company employs
GIndex- Governance Index, corporate governance measure of how provisions limit shareholder rights
Size- measured using the natural log of the total assets of a corporation.
ROA measures the return on assets for the firm in the current year
Firm Age- number of years as a public company
Leverage - measured as a firm's total debt divided by its total assets. *Big 4*- indicator variable of whether the company has a big four auditor *ROA*- Return on Assets, measures as net income divided by total assets
Book-to-market- calculated as the book value of equity, excluding preferred shares, divided by the market value of the firm on the balance sheet date
Cash ETR- Cash Effective Tax Rate, calculated as the amount of tax paid in cash divided by the firm's net income
Board Size- measures the size of the board of directors
Independent Chair- indicator variable, with a value of one if the chairman of the board was independent from the CEO and zero otherwise
Female Directors- measures the percentage of directors on the board that are female
CEO Age- age of the chief executive officer on the proxy statement date
CEO Tenure- number of years as chief executive officer on the proxy statement date *Directors' (Average) Age*- measures the average age of the board of directors *Directors' Tenure*- average number of years the directors have served on the board *Busyness*- average number of other public directorships per board member
Politician on Board- Indicator variable if the firm had at least one politician on its board of directors
Add_politician- indicator value of one if a politician has been added to the board of directors, zero otherwise
Drop_politician- indicator value of one if a politician has been dropped from the board of directors, zero otherwise
ATT- Average Treatment Effect of adding a politician to the board of directors. *DistanceDC*- measured as the natural logarithm of one plus the distance from a firm's headquarter to Washington D.C.

CASE STUDY: NINE MOTIVATORS OF A NON-TRADITIONAL STUDENT

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ABSTRACT

The purpose of this case study is to identify motivators that may be unique or more significant to the non-traditional student. By understanding these motivators, higher education institutions may be better able to target this student segment. This case study is observational but with a big caveat. Rather than planned and structured like much scholarly research, this may be viewed as somewhat anecdotal, stretching into personal recollections; initially, as a non-traditional undergraduate student in Thailand with the University of Maryland, Far East Campus in 1972, culminating with a DBA in 2012, and overlapping with current teaching of traditional and non-traditional undergraduate students at the Graham School of Business, York College of Pennsylvania. So, covering 49 years makes this research longitudinal, with observation of both the researcher and the subjects, resulting in the paradox of the student eventually becoming the teacher and being observed first as a student and then as a teacher. Therefore, most of this paper addresses that journey through recollections of the paths taken and the events and motivations for following those paths. At significant events in this journey, this researcher identified nine motivational points directing this non-traditional learner. When some decision points occurred the destinations to which the student was directed may have been unknown. However, in hindsight some motivations later seemed evident and, eventually short-term and long-term destinations were chosen. *This review is not correlated to existing research.* But identifies motivators that can form the basis for a later formal research and comparisons to literature.

INTRODUCTION

Having taught evening classes as adjunct faculty for many years while working full-time in a non-educational position, many of my students were non-traditional. I always felt greater empathy with them because I earned all of my degrees in a non-traditional manner.

Before the beginning this non-traditional student journey, a short background is needed for context. I began my formal college education in 1968 at Villanova University the fall after graduating from high school. High school was not too hard, and I should have had higher grades, but I tended to do well only in those classes I enjoyed. Choosing Villanova was not made by any real evaluation of the school and its' curriculum. Rather, it was because I knew a few high school friends who went there; friends who I really never touched base with while at Villanova. My parents wanted me to go to college, because I would be a first-generation college student. Alas, too much partying, having a car on campus, and my home being less than two hours away became a recipe for failure. I left after two semesters, but I doubt they would have allowed me back for another. Back home the next year I took one course at a local Penn State campus and then two at York College of Pennsylvania, with marginal grades in each. My parents spent a lot of money, and I incurred a lot of debt but probably only earned 18 hours of transferable credit. So, out of college, working various jobs, enjoying life, and meeting a girlfriend who I would later marry; not a care or objective in the world.

1970 rolled around, and I was rated A1 for the draft, with a line number of 32, meaning that I was going to be drafted early that year – received the 'Greetings' letter and reported for induction on 5 February, 1970. However, an option was provided for those who did not want to go the Army route: you could volunteer with another branch and, possibly, have your date of entry into active duty delayed as long as 90 days. Like with today's NFL draft, negotiations with the other services began before the final induction date. Even without a college degree, the Marines offered me a commission, and the Navy and Air Force offered guaranteed jobs as an enlisted person; I chose the Air Force. Three months later I was at Lackland AFB, Texas for basic training.

NINE MOTIVATORS

Non-Traditional Motivator #1: A Reason to Excel

Guarantees are not always fulfilled, as 'needs of the service' come first. By September of 1970 I found myself married and working as a taxi and crew bus driver at Ellsworth AFB, South Dakota. Although I did not know what I wanted to do, I knew I did not want to drive busses. During my first few weeks at Ellsworth, I had a mandatory meeting with my career advisor. At that meeting I found out that after 15 months in my current job, I could apply to cross-train into a new field. 18 months later I was off to technical school at Chanute AFB, IL, to attend the Maintenance Analysis

Course and enter a new career field. By that time I was also married and had a baby daughter. For me, more personal responsibilities provided the reason to excel.

Non-Traditional Motivator #2: Seeing the Bigger Picture

At the 12-week, eight-hour-a-day Maintenance Analysis Course I found that I really loved the practical application of statistics. During my prior assignment, after I found I was accepted into my new career field, I was allowed to spend my last three months at Ellsworth AFB in the Reports and Analysis Office of the transportation organization, obtaining some exposure to the environment where I would work following technical school. Although I was not yet trained in the analysis skills. I would later learn in the Air Force course, I did receive exposure to how those skills are used to improve the maintenance, utilization, and operation of the base's vehicle fleet. This prepared me to understand why what I was learning at the school was important. At the Maintenance Analysis Course, most of the other students had just completed Air Force basic training and had no Air Force work experience. Essentially, they were just out of high school, like the vast majority of today's incoming college freshman.

Non-Traditional Motivator #3: Something Missing in Life

I excelled in the Maintenance Analysis Course, graduating with a near perfect grade and finishing two weeks early due to testing out of the last block of the course. That block dealt with much of what I had learned during my three months in the Reports and Analysis Office at Ellsworth AFB. Upon graduation I expected to go back to Ellsworth AFB, but my orders reassigned me to U-Tapao Airfield, Thailand. Families were not permitted, so 30 days later I was off to the other side of the world, leaving my wife and 5-month old daughter to live with relatives in York, PA. In 1972, before the Internet and cell phones, immediate communication with family far away was nearly impossible and cost prohibitive. When the take-home pay you lived on was about $60 every two weeks, a $30 three-minute call home was out of the question. Mail took about two weeks from initial mailing to receipt of a mailed response. Although we worked 12-hour days seven-days a week, loneliness crept into those non-working hours. Obviously, there are ways to have fun to fill the hours, but some fun was cost prohibitive, even if it did fall within a person's social norms. However, at that time formal accredited college education at U-Tapao was free, and it was conducted by the University of Maryland, Far-East Campus. Typically, the instructors were currently serving military officers, who had been adjunct faculty at stateside schools. Not only did they bring the essential scholarly aspect to their classes, but they also could show application to the wartime environment within which we were all working. Never in my conventional college education before the military had I earned an A. Now, I breezed through the courses the University of Maryland offered, and achieving A's became the norm and my minimally acceptable grade.

Non-Traditional Motivator #5: An Achievable Goal Seemed Within Reach

It is now 1973, and I was 22 years old and a first-line manager. Having just been promoted to Staff Sergeant (E-5), I was assigned to Plattsburgh AFB, NY as the Non Commissioned Officer in Charge (NCOIC) of Production Analysis for the 380th Bomb Wing, supervising a staff of four or five junior analysts. I was back with my family and a baby daughter I had never really spent any time with, whom was now actually a toddler. During my orientation at my new assignment, one of the required stops was with the Base Education Office. Setting and eventually achieving a goal of a college degree was not something I had even considered. However, the NCOIC of the office reviewed my education record, compiled from three civilian schools, Basic Military Training, my Air Force technical training at Chanute, and my courses with the University of Maryland while I was in Thailand. He introduced me to the Community College of The Air Force (CCAF), which was just founded in 1972. As a degree-awarding accredited institution, CCAF accumulates results of formal military-conducted programs, and accredited public and private institutions of higher education, into appropriate Applied Science degree programs. Because I had already attended formal military schools, I was already enrolled in the program, and I could transfer my earlier civilian coursework into that program. Additionally, he explained how the State University of New York (SUNY) had a Regents External Degree program to which I could submit my CCAF transcript. Without initially realizing it, I was already on my way to an achievable goal of an Associate Degree. Subsequently, after attending an advanced statistics school, again at Chanute AFB, I achieved that initial goal.

Non-Traditional Motivator #6: Expanding the Goal

My assignment at Plattsburgh AFB was relatively short, just over one year. As mentioned previously, during that assignment I attended the Advanced Maintenance Analysis Course, and the supervisor of that course submitted a recommendation for me to return to Chanute AFB as the NCOIC instructor of that course. Although it meant uprooting the family again, I accepted, as it would be a guaranteed four-year assignment in a field I truly enjoyed. The Air Force sent me to a formal course to learn how to be an instructor, and throughout that tenure I was required to attend frequent continuing education courses. However, in my level of teaching, to first line and mid-level managers, that teaching meant I needed to learn how college teachers teach. The individuals attending my course were not new entrants into the Air Force. They usually had more field experience than me, sometimes they were Air Force civilian managers, and always, they were volunteers for the school so that they could gain the education needed for future promotions. They expected me to be not only a maintenance analysis expert, but also an education professional. Chanute's military training classes were mostly held during the day, but at night the base essentially turned into a civilian college campus. Each night several nearby colleges, including the University of Illinois Champaign-Urbana, Eastern Illinois University, Charleston, IL and Parkland College, Champaign IL, bussed in their professors to teach 'on-campus' courses. Other than the fact that many students wore uniforms. Most were not between the ages of 18 and 23, Chanute AFB became a civilian school. My civilian supervisor, Ruth Hensel, already had her doctorate from University of Illinois, and she pushed me to complete my bachelor's degree, which I earned in 1976. Interestingly, although I had over 60 hours in residence at Eastern, my first day on the physical campus was the day before graduation. My wife and daughter were at my graduation.

Non-Traditional Motivator #7: A Mentor to Encourage You

Three years later I was again back in the field as the NCOIC of Production Analysis, this time at Myrtle Beach AFB, SC, with the 354th Tactical Fighter Wing. By then, my wife and I had two children, and I had been promoted to Technical Sergeant (E-6). Life was good, I enjoyed my job, no war theaters to be deployed to, I had my bachelor degree under my belt, and Myrtle Beach is a pleasant place to be stationed. I was contented. Contented until my commander, Colonel Neely, Deputy Commander for Maintenance, ordered me into his office. The Colonel and I got along well, and he liked the briefings my staff and I prepared for him and the monthly maintenance summaries we built and distributed to his subordinate maintenance organizations. Col Neely called me to his office because he was reviewing my personnel folder, and he noticed that I had earned my bachelors' degree several years earlier. In 1979 the Air Force was experiencing one of its' cyclical shortages of officers, and Colonel Neely wanted to know why I had not applied to go to Air Force Officer Training School (OTS). I had no legitimate reason, other than I was comfortable with where I was and the opportunities that an enlisted career offered. While I sat with him, he made a few phone calls to the OTS selection board. The story is more complicated than what I outlined. But he ordered me to apply to OTS. Colonel Neely knew me well, and what he wanted for me was to not just settle for what was easy. He wanted me to challenge myself and to be in a position with others would also challenge me. He was a tough but fair commander who cared for his people. However, he was demanding, and he pushed his airmen to excel. He also gave them the tools to excel, and two months later I reported to Lackland AFB's Medina Annex for 12 weeks of OTS.

Non-Traditional Motivator #8: Broadened World View

After being commissioned in late 1979 and spending four years as a junior staff officer at Bolling AFB, DC, I was transferred to Cleveland, OH to be the Resource Manager for the 3353rd USAF Recruiting Squadron. As a Captain and third-ranking officer in the squadron, my staff of six NCOs and I were responsible for all non-recruiting activities, including personnel administration, transportation, finance, and operation and maintenance of our 30-some facilities. Our squadron had about 100 members and was responsible for all Air Force recruiting in Northern Ohio. There are no other Air Force organizations in that half of the state, so we also had to handle unusual situations, like death notifications to the surviving families living in the area, regardless of where the deceased Air Force member was stationed. Later, when the Operations Officer was transferred, I assumed his position as being responsible for the actual recruiting and processing of recruits into the Air Force. Basically, I was now the second-in-command in the organization. So, this three-year assignment exposed me to every facet of one of the 39 Air Force recruiting squadrons in the nation. At the beginning of this tour, I enrolled in an MBA program through Ashland University (then Ashland College), Ashland, OH. It was evident to me that my recruiting responsibilities were to be of much greater scope than running an analysis office. No longer would one specialized skill set be sufficient for success. I would ultimately have responsibilities in every aspect of management, operations, and support, and the MBA curriculum seemed to address

that broad scope. However, with two courses left to go in my degree, I was transferred to the Pentagon. Although Ashland's official policy did not allow for those last two courses to be taken elsewhere, the school made an exception, and I finished my last two courses at the University of Michigan campus in Arlington, VA.

Non-Traditional Motivator #9: Empty Nest – Doing Something New – Becoming a Scholar

Notable in the preceding path to my MBA is that all of this occurred prior to 1989 and the rise of the global Internet. Email was gaining prevalence between businesses and government organizations, but it was still in its infancy for personal users. Windows 1 was not released until late 1985, and the mouse was not widely popular until 1984. Therefore, although 'distance learning' may have been an idea before 1989, the technology to widely implement that idea was really not available. I retired from the Air Force in early 1997, and I then began teaching as adjunct faculty for York College of Pennsylvania and Pennsylvania State University, York Campus. About the same time, I began full-time work for Charming Shoppes, a major women's specialty apparel retailer with over 1,000 retail locations. After I had been with Charming Shoppes for several years, the University of Phoenix participated in a higher education fair at our corporate offices in Bensalem, PA. The timing was perfect; I had been teaching for several years, and Charming Shoppes had a generous tuition assistance program, so the first year would cost me almost nothing. When I signed up to take that initial online course, I did not have the intention of pursuing a doctorate. However, I enjoyed it, and I enrolled in a subsequent five-day residence course in Arlington, VA. I loved the professionalism, the scholarly environment, and the week of learning. I thought I knew a lot; after all, I was teaching at a college. However, in those five days I realized that there was so much more that I needed to learn – I was hooked. I wanted to be a scholar and impart the knowledge that I would learn to my students. I wanted to learn for the sake of learning. I successfully defended my dissertation in 2012 and earned my doctorate.

PURPOSE OF THE CHRONOLOGY

About 15 years ago I happened to read a volume of Stephen King's Dark Tower series. Perhaps I listened to it on tape, as back then I spent four hours a day commuting. I then read or listened to the entire series and several of King's other novels. When Stephen King published the last and eighth volume to his Dark Tower series, more than 20 years after publishing the first volume, he ended the epic with the main character, Roland Deschain, being in the same location, The Dark Tower, as he was when he appeared early in the first volume. Many of King's avid readers complained that they were disappointed that Roland did not reach his destination. In a later work, King told those disappointed readers that the point of the series was not the destination. Rather, it was Roland's journey. In that same vein, I could have quickly listed each of the nine motivators I presented here. However, the journey is what is important. Why does a non-traditional student go to college? The answer is not simple and straightforward. What is more important is why the student made that education decision. That 'why' is not readily evident, and even the student may not be able to explain the 'why'. The decision is important, but so is the journey that led to the decision.

CONCLUSION AND NEXT STEPS

As was noted in the introduction, unlike typical scholarly research, this case study paper was observational and somewhat anecdotal. It was not constrained by a review of existing literature. Rather, it answered the question of, 'Why did this researcher pursue and reach an educational goal?' On the surface it appears that no goals were really set, and this researcher just ended up where he is now. However, in hindsight there were goals, albeit unstated and unwritten. This violates part of goal-setting theory covered in probably every freshman business management course. Not only was the destination unknown, but the path was also unknown. After all, how can you identify the path if you do not know where you are going? Should higher education just be wandering around? Is this how a student should approach their education? Normally, the answer is no. However, what about some non-traditional students?

In reviewing the previous narratives associated with nine motivators of a non-traditional student, were they really *motivators* or were they actually *opportunities*? For some of the contexts provided, you could arguably use either word. However, something changed, and a new path or opportunity presented itself. These nine points may be unique to one individual's journey, but do other non-traditional students encounter similar life events that direct them down an educational path? Future research could use this case study as a starting point for broader research into the topic. Every student is different but, perhaps, not really unique in their motivation. Colleges and universities have a rather typical and structured process to reach out to those graduating high school seniors for the new undergraduate class. However, every potential non-traditional student is not only different in many more ways, but they are also unique in

their motivation or opportunities. The challenge, then, is to identify and categorize those motivators or opportunities and develop programs to appeal to them. The emergence of and marketing campaigns of online universities like University of Phoenix, Southern New Hampshire University, and others seem to target that non-traditional student. Likewise, it seems that almost every brick-and-mortar college has similar opportunities. However, are these options just appealing to the convenience of education? Convenience is important and it helps, but is there more to the motivation of the non-traditional student?

This article was written as the basis of a case study, not as a research article. A formal list of references was not presented by the author.

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SUPPLY CHAIN DISRUPTION DURING THE PANDEMIC (COVID-19) IN THE UNITED STATES

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ABSTRACT

The COVID-19 pandemic has impacted on world economy significantly. It presents an unprecedented challenge to public health, supply chain system, and food system worldwide. In the United States, many manufacturers, companies, hospitals, retailers, and wholesalers were not prepared for what was yet to come. Most of companies have struggled to maintain a steady flow of goods, medical supplies, and services. The US supply chain has been facing multiple obstacles. Firms were not prepared to face a situation like this as it was unprecedented. They do not have proper strategies to deal with. Many organizations are still experiencing difficulties to construct a sustainable supply chain system.

Global sourcing has affected the U.S. logistics and supply chains immensely. The current model and process have not been able to capture these disruptions properly. In this paper, the disruptions of the pandemic to organizations in the United States will be discussed. The demand and supply mismatch and the need for a dynamic supply chain will be discussed as well. Solutions and strategic options that are being contemplated will be presented. Suggestions as to how it can be prepared to prevent it from happening again in the future.

INTRODUCTION

On January 30th, 2020, the World Health Organization declared COVID-19 a global health emergency (World Health Organization: WHO, 2020). By the end of March many countries around the world had placed travel restrictions and also introduced lockdowns which would prevent the spread of the pandemic this led to an economic crisis and affected all the sectors of the economy. One of the hardest hit sectors from the pandemic was the supply chain sector. The survival of human beings relies on essential items during the pandemic and that can be satisfied by appropriately utilising the crucial resources, like raw materials, employees, and active logistics systems (Singh, et all, 2020).

With the pandemic striking the United States by surprise, supply chains were put in a vulnerable position; the demand for products along with the new restrictions has forced supply chains to weaken. The importance of clearly laying out the supply chain is that it helps a company define its own market and decide where it wants to be in the future. A supply chain disruption is any type of sudden change (or crisis) that negatively impacts the process. A supply chain is almost similar to what a food chain is, because it all connects to each other. A supply chain is a series of interconnected parts, and in complex manufacturing, different tiers of supply chain can look like a pyramid. There were shorted of labor as people refused to work for fear of working and being exposed, realizing they could make more money by staying home and collecting unemployment, or not being able to work because they had no one to watch their children.

When this “normal” course was disrupted, corporations are left to act quick on their feet. Due to these new normal we do expect new change but “consumers will continue to want low prices (especially in a recession), and firms won’t be able to charge more just because they manufacture in higher-cost home markets. The pressure to operate efficiently and use capital and manufacturing capacity frugally will remain unrelenting. Challenges like these are totally out of our control, have caused many businesses to suffer in management, effectiveness, competitiveness and the list can go on and on.

During the pandemic most of the supply was focused on two places that is essential items and clinical items. The demand for PPE (Personal Protective Equipment) grew rapidly as it was a way to prevent the virus from spreading. Hospitals, nursing homes and other health care facilities didn't have the masks and equipment needed to protect their workers. Some got sick and spread the virus. The disruption in the supply of not only medicines but healthcare supplies like the PPE kits is also alarming and has led to shortages causing the spread of the virus. The demand for essential items like food also surged before the lockdown as everyone wanted to stock up on supplies and be prepared for the lockdown. Many problems were faced as it was extremely difficult for the demand and supply to meet. Most of the retail stores were wiped clean. In Union, New Jersey, a Target opened at 8 a.m. and had sold out of its full stock of milk and bottled water five minutes later (Borter, 2020).

RESEARCH QUESTIONS

Manufacturing, production, service, and logistics supply chain in the United States is the most absolute and necessary in a functioning economy. Consumers require many resources like food, water, health products, etc. The needs of the consumers are met by many leading organizations in various sectors, all of these organizations have a well-constructed supply chain team that ensure that the products are transported to the required destination on time. Due to the sudden nature of the pandemic many sectors were faced with problems regarding supply chain. As the virus was air bone and had many casualties there were lockdowns that were instructed all over the world to minimize the spread of the virus. This meant that supply would not meet demand.

The above statements have led to the following research question:

How was the food supply chain impacted by the pandemic?

How did the pandemic affect the supply chain of medical and health supplies?

RESEARCH METHODOLOGY

There were several issues that led to disruptions of supply chains in various sectors. Due to various factors like the lockdown, employees testing positive and the hygienic distribution of products had many worried and some even went out of business. This paper is a case study of the impact of COVID-19 on supply chain in the United States. This case study gives insights as to how various sectors were affected by the pandemic and how many supply chain disruptions were combated in such difficult times. This case study provides the readers with illustrative examples and elegant explanations, while other methods would be broad overview of the problems that are being faced. A case study is an efficient strategy to explore "how" and "why" questions. A Case study directly enters the natural setting of problems that are faced for a thorough analysis (Munstermann & Weitzel, 2008).

According to Zikmund (2003), case study method is an exploratory research technique that intensively investigates one or a few situations similar to the research's problem situation. The primary advantage of the case study is that an entire organization or entity can be investigated in depth and with meticulous attention to detail. The highly focused attention enables the researchers to carefully study the entire case properly. According to Bonoma (1985), case study research is particularly useful when the phenomenon under investigation is difficult to study outside its natural setting and also when the concepts and variables under study are difficult to quantify. Case study is based on a process model and it is a description of a management situation. It is particularly well-suited to this research paper since existing concepts in logistics innovation seems inadequate (Yin, 2008).

E research was employed in order of to search for information and date about supply disruption. To date, research has been influenced by the rapid growth of internet and information technologies. These trends will continue, and likely accelerate, as the 21st century progresses. E-research encapsulates research activities that use a spectrum of advanced information communication technology capabilities and embraces new research methodologies emerging from increasing access to research instruments and facilities, sensor networks and data repositories, software and infrastructure services that enable secure connectivity and interoperability (Zikmund, 2003). E-research capabilities serve to advance and augment, rather than replace traditional research methodologies. Improved access to knowledge and information will enable researchers to perform their research more creatively, efficiently and collaboratively across long distances and disseminate their research outcomes with greater effect. Reports by healthcare workers and their comments in the press have also been used to give a first-hand account of how the pandemic affected frontline workers. Academic articles have been widely used in this research paper which has information given by doctors, researchers and professors of science and technology. Information given by people experienced in this field provides clear and concise facts which make it easier to understand the supply chain disruptions.

Data Base system of State University of New York was also employed which enabled us to find many relevant information on the topic pertaining to scope of this paper. The system helped and incorporated the use of communication and technology to expedite research from reputable websites that provided us with more precise information. Articles from academic peer reviewed journals were explored. Relevant information gave us a better understanding of the topic and how these issues are being overcome. To visualize the content, we also used a map that

shows the severity of the situation that would help readers better understand the content. The map shows the readers the COVID outbreak in food processing facilities, meatpacking plants and farms and ranches throughout the United States of America.

LITERATURE REVIEW

In the article A Global Digital Citizen Science Policy to Tackle Pandemics Like COVID-19, Katapally stated, "the Covid-19 pandemic is an extremely complex existential threat that requires cohesive societal effort to address health system inefficiencies and to overcome gaps in real time data analytics" (Katapally, 2020). No one was expecting the Covid-19 pandemic so in order to overcome the losses we have experienced because of it, we must all come together to get past this. The data shows how many businesses got hit hard from this pandemic and we have to come together to get past this to try and fix the U.S. economy. From all the shutdowns across the world, it caused global sourcing to be impacted because there was a decrease in supply being made and it was difficult to get products overseas because of travel restrictions. The Covid-19 pandemic caused a bullwhip effect to happen because the demand for products increased and the supply yield could not keep up with the demand for the products. The demand needs yielded supply chain inefficiencies because of the pandemic. The Covid-19 pandemic hitting caused many things to consider like the future of global sourcing, demand and supply bullwhip effect, development of contingency plans for the future in case of another pandemic, and the possibility of lean and local production systems to cut costs and being more responsive to the market needs (Handfield, Graham, Burns, 2020). Global sourcing and companies that had only relied on that took a hit when the pandemic hit because it was hard for them to get products at the beginning of the pandemic with shutdowns and travel restrictions. This is going to make companies look into things like lean and local production systems to be able to cater to the market's needs faster rather than global sourcing which can make it difficult for companies to get products in pandemic times.

The Covid-19 pandemic caused a decline in the production and trade across the world on global supply chains. The economy can be fixed and go back to normal if the people who have been saving up during the pandemic spend their money to help boost the economy by investing in stocks or even just buying more products and getting their money back into the market (Walmsley, Rose, Wei, 2020). The United States cannot rely completely on global sourcing anymore because by doing that when the pandemic hit, they could not get enough supply to fulfil the demands of the people. That happening caused the United States economy to decline because there were not any products to buy in stores due to the lack of supply from global sourcing because of restrictions put in place all over the world.

According to Bimpizas and Genovese, "Apple's supply chain was badly disrupted too, as many of the companies supplying Foxconn (the Chinese manufacturer which actually produces the iPhone's hardware) were badly impacted" (Bimpizas, Genovese, 2020). Apple was affected because they use global sourcing to obtain their products. From having shutdowns in China and across the world, people could not go into work to make and produce the products that Apple needed. It was also difficult because with travel restrictions and such it made it more difficult to get the products overseas to be able to sell in the United States. That had a negative impact on the United States economy significantly. That all linked back to global sourcing, producing the products from somewhere other than the United States and how it had a negative impact on the U.S. economy during the pandemic time.

Luckstead addressed the sudden closures and shifts in spending habits caused substantial disruptions in the food supply chain because of two primary reasons. Firstly, food growers, processors, and distributors had to simultaneously adjust to a plummet in demand by the food service industry and a spike in demand by food retailers. Secondly food products destined for the food service industry are different in terms of size, packaging, and labeling requirements from those destined for food retail outlets (Luckstead, et all, 2021). After the United States declared that they would be going under a lockdown many people wanted to load up on essential food items that would last them for a long time so that they rushed to their nearest food retailers before the lockdown was implemented which led to quick rise in demand for food products in food retail stores. On the other hand, there was steep drop in the demand for food products by restaurants as the country was going into lockdown. Which was extremely chaotic for the food supply chain to adjust to. Additionally, the food service industry and food retailers had the same product but with different sizes, labelling and packaging. This was because the food service industry bought food products in bulk. At this time of crisis, food security is associated with consumers' access to food rather than food availability. Amid the pandemic the supply of food is not important but in fact the availability of food that is not contaminated by the virus so that the consumers do not have anything to worry about.

A major concern shared by all food companies is preserving the employee's health and the provision of sufficient workforce due to those who do not want to work because of sickness or coronavirus fear (Aday & Aday, 2020). Health of the workers in the food sector are of the utmost importance as if one of the workers that is involved in the supply chain of food can easily contaminate his colleagues and the product that is being supplied. A study shows that the Coronavirus cannot be transmitted by food that is it is not foodborne (Deering & Monroe, 2020). The real issue here is the containers or materials the products are shipped in. The virus lasts for up to 2-3 days on plastics, up to 24 hours on cardboard, and 2-8 hours on aluminum bottles. These materials are essential in the proper supply of food products and if a worker is infected by the virus the worker could potentially risk many other lives without realizing. This is why the safety of worker is of the utmost importance. There is now an urgent requirement for the industry to ensure compliance with measures to protect food workers from contracting COVID-19, to prevent exposure to or transmission of the virus, and to strengthen food hygiene and sanitation practices (FAO and WHO, 2020). As the above paragraph states how important the health of workers in the food supply chain is it is essential for all the workers to follow protocol so that the spread of the virus is minimized. This can be done ensuring workers are equipped with sanitizing station and proper PPE (Personal Protective Equipment). Workers should be equipped with gloves all the time to ensure that the materials that are transporting food products are not carrying the virus.

Last year, when Covid 19 hit, it "disrupted" supply chains all over the world. In the United States, many firms ascribed to emergency planning and disintegrating departments in its establishment. Their focus was on getting health gear to all front-line workers. This meant moving faster than they initially would if there was any disaster or tragedy. Building resilience throughout the pandemic is what supply chains concentrated on throughout 2020. They had to mobilize the command canter and initialize response plans, so they could establish utilizing rules for responses related to all supply chain interventions and management. They also had to prioritize and sense new risks and implications to the supply chain components, products/services, and the ecosystem. They must analyze the what-ifs scenarios and protocols for sourcing, planning, distributing, and service implications. Once this is all done, the final step would be to develop ways to track and measure the effects of their steps being taken. The opportunities extended by the institutes brought together government entities and the private sector to rapidly develop innovative projects that contributed to our nation's COVID-19 response efforts. The pandemic created a ripple effect that showed there wasn't only a lack of excessiveness in the supply chain, but also a lack of being transparent. Medical supply chains that span oceans and continents are the fragile lifelines between raw materials and manufacturers overseas, and healthcare workers on COVID-19 front lines in the United States. (Modernhealthcare.com, 2020). The enormous surge in demand of PPE kits was not satisfied by the domestic supply chains in the United States and imports into the country were halted because, Asian factories shut down, halting exports of medical supplies to the U.S. Meanwhile, government stockpiles were depleted from a flu outbreak a decade earlier, and there was no way to rapidly restock. The federal government dangerously advised people not to wear masks, looking to preserve the supply for health care workers and this exposed many to the virus.

The United States is by far the largest importer of face masks, eye equipment, and medical gloves in the world market, followed by Japan, Germany, France, and the United Kingdom. Overall, this analysis points to the high vulnerability of the United States to disruptions in the global supply chain of face masks, eye protection, and medical gloves, and especially to disruptions in exports from China. The COVID-19 outbreak in China in late 2019 led to a surge in demand within China for personal protective equipment (PPE), especially for disposable surgical masks as the government required anyone leaving their home to wear a mask. In response to demand, China's government not only restricted its PPE exports, but it also purchased a substantial portion of the global supply. These shocks contributed to an exceedingly large disruption to the global supply chain of PPE (Cohen and Rogers, 2020). As the virus continued to spread the demand for PPE in other countries also exceeded which led to them restricting their exports of PPE. Overall, then, with respect to imports, the United States is the biggest importer and so is highly dependent on the global supply chain, and with respect to exports, the U.S. failed to prioritize the country's public health needs.

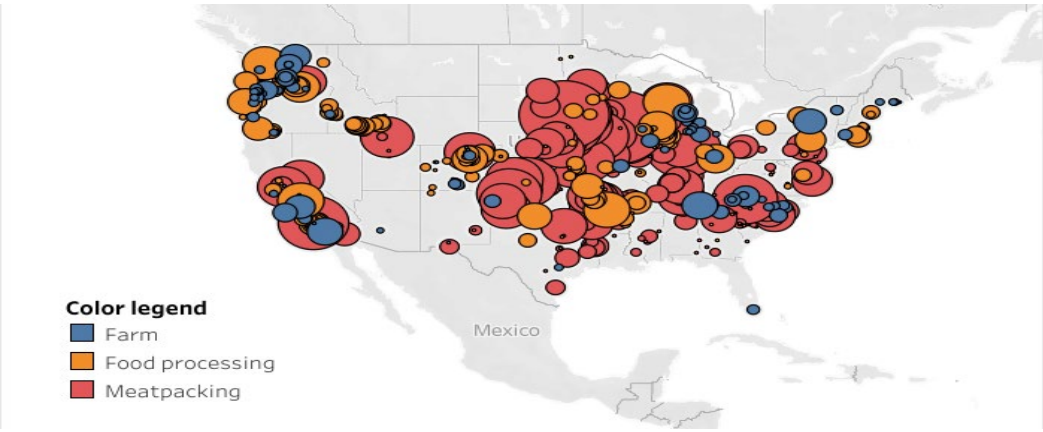
The pandemic caused major disruption in the supply of drugs that were essential for the recovery of covid patients. The United States and the European Union each account for one-quarter of FDA-registered facilities around the globe, while China and India combined account for 31% (Alvaro, 2020). A large number of drugs are imported from China and reliance on one region during a pandemic causes major disruptions. All drug manufacturers rely on access to safe Active pharmaceutical ingredients (APIs) to manufacture their product. APIs are largely synthesized, fermented, extracted or isolated in countries outside the United States before they are packaged and exported (Jung, 2020) packaging of these drugs has to be done outside the country and then shipped to U.S. and because of temporary lockdowns of manufacturing plants and delays or suspension of international shipments the supply is of drugs is delayed. Further contributing to disruptions are border restrictions and suspensions on air cargo carriers. Crucial equipment is also in short supply, says Glenn Richey, chair of the department of supply chain management at Auburn University's Harbert College of Business. "We're seeing issues with the production of vials and syringes and those types of things that actually move the product from the storage container to the person," he explains. This will be an ongoing concern, Richey adds, as companies try to create the hundreds of millions of doses that will be necessary for the U.S. population to reach herd immunity (Bushwick, 2021). There have been reports that some pharmacies have closed due to the pandemic, and widespread illness, quarantines, and social distancing measures may increasingly disrupt pharmacy access. In addition, given a surge in demand for certain types of health care, there will be heightened need for many medicines such as those used to treat respiratory disease and critical illness. There may also be demand surges for specific medicines based on media coverage, emerging evidence of benefit, or other factors (Alexander & Qato, 2020).

FINDINGS

The pandemic led to so many industries and organizations being shut down. The production of so many goods and services were halted, and this caused major problems in the supply of necessities. There were various reasons as to why the supply of essential necessities had faced problems which resulted in many firms closing shop.

How was the food supply chain impacted by the pandemic?

According to data collected by Food and Environment Report Net Work (FERN), *as of March 5, at 12pm ET, at least* **1,398** *meatpacking and food processing plants (571 meatpacking and 827 food processing) and* **388** *farms and production facilities have had confirmed cases of Covid-19. At least* **88,022** *workers (57,526 meatpacking workers, 17,567 food processing workers, and 12,929 farmworkers) have tested positive for Covid-19 and at least* **375** *workers (284 meatpacking workers, 48 food processing workers, and 43 farmworkers) have died. Below is the map which was adapted from web site of Food and Environment Report Net Work (FERN).* https://thefern.org/2020/04/mapping-covid-19-in-meat-and-food-processing-plants/



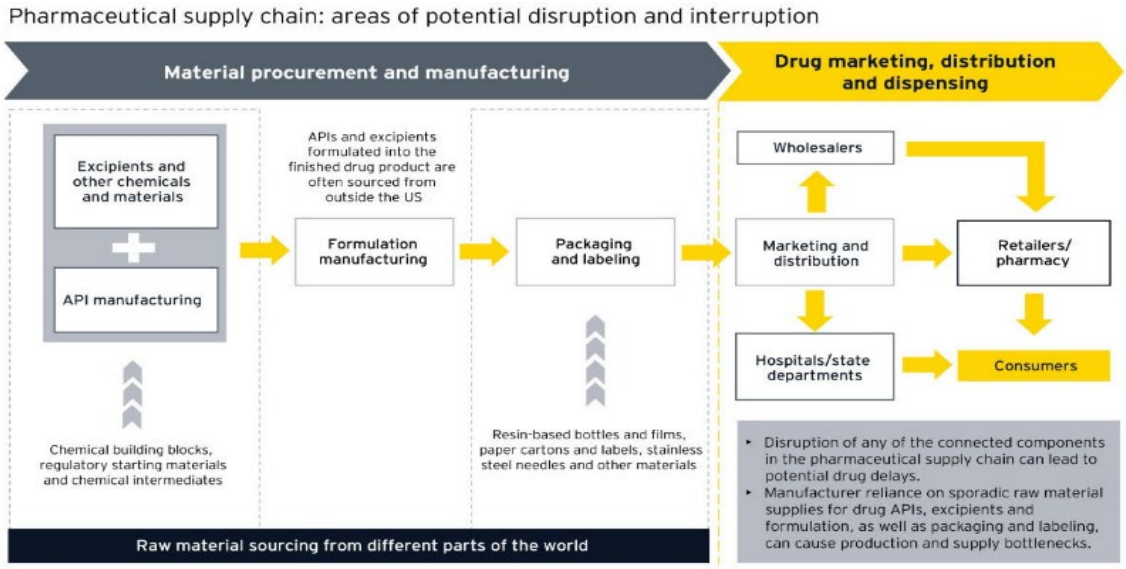
Many food companies faced challenges in their production due to the COVID-19 outbreak. They work hard to keep up with supply and demand. Various type of food manufacturing was in difficulty since the disruption of supply chain. They need orders from customers in order to generate enough income to carry on their operations. On the other hand, they need ingredients and materials to produce their product. United States Government has provided some assistance; however, it was not enough for them to cover all expenses. The shortage of labor also impacted on food

manufacturing. There had some drawbacks such as rigid and lengthy supply chain issues. In addition, using small number of large production facilities would create extensive problems in times like these as if one colleague is tested positive for COVID-19. It could result in the temporary shutdown of the whole facility. This would cause mismatch in supply and demand.

How did the pandemic affect the supply chain of medical and health supplies?

America's healthcare supply producers, including 3M and Johnson & Johnson, shuttered their U.S. factories, moving mostly to China. Within 10 years, 90% of U.S. medical masks were being made overseas (Modernhealthcare.com, 2020). Several indicators point to a potential short-term shortage of certain drugs because of temporary lockdowns of manufacturing plants and delays or suspension of international shipments. Further contributing to disruptions are border restrictions and suspensions on air cargo carriers. The sporadic and continued flare-ups of infections, increasing numbers of patients on ventilators and the high demand for ventilator-related drugs are contributing to short-term supply shortages. Drug shortages seen so far are mostly for products used for COVID-19 patients in ICUs or on ventilators. Some of the shortages are artificial and a result of stockpiling, protectionist trade restrictions or lack of enough inventory (Jung, 2020). A survey of generic drug manufacturers conducted in April by the Association for Accessible Medicines (AAM), which represents generic drug makers, found that travel and transport costs sharply increased by nearly 225% on average. The long-term implications of the financial impacts of the pandemic on airlines could also be significant. Disruptions at ports, quarantined crews, and labor shortages due to lockdowns are all contributing factors. Restrictions of people's movement have also made distribution and shipping difficult, which can impact drug production if an API is made in one country and must be shipped to another for final formulation. Below is the flow chart of pharmaceutical supply chain displays area of potential disruption and interruption.

Adapted from https://www.ey.com/en_us/strategy-transactions/covid-19-risks-and-resiliency-in-the-drug-supply-chain



In December 2020, the candidates from Pfizer, BioNTech, and Moderna were quickly approved for emergency use by the Food and Drug Administration. But two months later, only 10 percent of Americans have received at least one shot. And fewer than 3 percent of them have received both of the necessary doses. The distribution process of the vaccines is very long and starts with the vaccine being manufactured and stored in vials which are shipped from the manufacturing facility on behalf of the federal government that keeps track of the doses and decides how to actually distribute it. Then the government informs individual health care providers about how much doses to expect and the manufacturers ship the doses accordingly (Bushwick, 2021). Anything can go wrong in such a long chain of distribution and the pandemic has already led to a disruption in transportation.

STRATEGIC OPTIONS

The impact of COVID-19 on United States supply chain system is very significant. Firms, manufacturers, hospitals, retailers, and wholesalers were not prepared for the problem caused by COVID-19. Most of companies have struggled to maintain a steady flow of goods, medical supplies, and services. COVID-19 caused a major supply chain disruption in the United States inevitably. However, firms already identified and understood the big problem of supply chain disruption. Therefore, it is very important for firms to direct towards a relevant need of forward-looking strategies. Firms who effectively adapt to change and better prepare will be able to manage disruption and consistently meet their challenge. Below are strategic options for firms to prevent supply chain disruption in the future.

1. Diversify Supply Chain Process

The threat to the supply chain system in the United States is firms keep relationships with a few suppliers or producers. United States supply chain system have been suffered due to Non-Diversify Supply Chain Process. It is suggested that they must start the process of diversifying businesses across multiple geographies to reduce risks of supply chain disruption during the pandemic (Covid-19).

To prevent firms from supply chain disruptions. They are required to set up a diversified supplier portfolio so that they will be able to mitigate the risks posed by Covid-19 or any future pandemics. Firms that rely on a few suppliers or producers from one particular country may face significant supply chain disruptions. Dependence on a few suppliers generates a lack of agility that prevents reconfiguring the supply chain whenever required. Therefore, it is very important to diversify production, service, sourcing, and logistics in order to protect United States supply chain system.

2. Responsive Strategy of Process

In the event of any pandemic such as Covid-19 comes back to the United States again, the responsiveness of logistics and supply chain processes is very critical. Firms must prepare their systems and their procedures must be ready to handle the shocks in future. Firms need to have the proper process in place to convert into intelligent workflows. The process starts from demand management and delivery strategy. They must have proper procedures, manpower and technology to respond to the urgent needs of logistics and supply chain. This will close the current gap in a firm's ability to intuit the changes in the turbulent environment.

The Black Button Distillery located in Rochester NY is a good example of a company that came up with an entrepreneurial idea in response to a covid-19 disruption, they started producing hand sanitizer with their alcohol ingredients. Hand sanitizer is a product big companies were not even able to get because suppliers were not prepared for the high demand, thus there was a shortage. It only took a couple of weeks for Black button distilling to start producing 70,000 bottles a week. The entrepreneurial method employed by Black Button Distillery to make hand sanitizer is an important aspect larger firms should integrate into their business schemes (https://www.blackbuttondistilling.com/home).

3. Buy American

The pandemic revealed the need for an urgent and effective national response that restores the ability to manufacture everything from small components to multiplex machines in the United States. Policies favouring domestic production of essential products would create a large number of well-paid jobs for skilled and innovative workers that can provide resiliency in a crisis.

Identification and support for critical industries and technologies, financial incentives to build U.S. factories and strict "Buy American" requirements for government purchases are examples of possible strategies. This will create a strong inventory as well as raw materials, for when supply and demand come into play again. Additionally,

developing worst & best-case scenarios and how to prevent problems in those situations would be a significant strategy.

4. Technological Usage

Leveraging technology could be one of the factors to prevent supply chain disruptions during the pandemic and in the turbulent environment. Technology can be vital for visibility across the supply chain system as well as the advantage of firms to forecast.

The application of satellites could also assist firms become vigilant about supply chain problems and challenges. Firms may undertake strategies and practices to mitigate supply chain disruptions. Once firms are able to acquire relevant data, they need to apply and analyze these data properly. Firms should be able to convert data into meaningful information that will help them to predict supply chain disruptions and prepare required actions.

CONCLUSION

The COVID-19 pandemic has impacted and increased the potential for both disruption and interruption to the global supply chain system. Examining the proper process and building effective strategy are essential actions for future success. This paper demonstrates the devastating disruptions COVID-19 that has impacted on United States supply chains and how firms can effectively battle the disruptions to sustain their supply chains system. The disruptions affected all sections of the supply chain including medical supply, purchasing, food, manufacturing, inventory, demand, and transportation. The specific disruptions were manufacturing factories being forced to close or run at lower capacities to follow safety guidelines, less global transportation of supplies occurring and the speed at which it does is slow, suppliers not being able to keep up with the high demand of certain products, and firms not having the financial means to pay the suppliers.

Firms need to use their supply chain management skills to react appropriately to each disruption. Firms must also maintain the proper supply chain management, effective operations management, and superior logistics management. This paper recommends firms to implement Strategic Options which consist of Diversify Supply Chain Process, Responsive Strategy of Process, Buy American, and Technological Usage in order to be able to combat supply change disruption. These options will reduce the negative effects of the COVID-19 disruptions and can help sustain supply chains for any future disruptions that may occur.

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YELP RECOMMENDATION ALGORITHM USING PAM CLUSTERING OF RESTAURANTS

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ABSTRACT

In a world where technological advancements and big data are expanding at a tremendous rate, businesses need to consider embracing all they have to offer. User-Generated Media (UGM) provides industries with a wealth of User-Generated Content (UGC), and equipped with machine learning algorithms, UGC helps companies make informed business decisions. The ability to predict and assist a user's restaurant selection based on the individual's past likes/dislikes would be of great interest to the user community and business establishments. If the predictions are computed based on the various categories of a business, it would be even more attractive to the community. This paper presented an algorithm using the business, reviews, and user datasets from Yelp. We adopted Partitioning Around Medoid (PAM) clustering, a cluster analysis, on the features present in these datasets to cluster the restaurants with similar features, identify the cluster in which a user expresses a high affinity, and finally suggest a restaurant for the user which he/she has never been to or rated before.

INTRODUCTION

Yelp's motto is to "connect people to great local businesses." As a publicly traded company headquartered in San Francisco, Yelp functions as a crowd-sourced business directory in which users write reviews of local businesses. Established in 2004 by the founders of PayPal, Russel Simons and Jeremy Stoppelman have created a global network of user-driven reviewers that influence business practices and sales. The Yelp company name is derived from a combination of "help" and "yellow pages." Yelp operates on multiple platforms, including the Yelp mobile application and the online Yelp Reservations system. Beyond user reviews, Yelp also sells services and products to businesses looking to raise their profile. As of 2019, Yelp reported more than 192 million reviews on its site.

Yelp is a beneficiary of the emergence of user-generated media (UGM), which has had a significant impact on how users of the internet access information (Shao, 2009). User-Generated Content (UGC) is when previous clients share their experiences online, which allows others, including prospective clients, to read and engage (Bahtar, 2019). Yelp users access the platform primarily for information-seeking purposes and because it is entertaining and convenient (Hicks et al., 2012). With this influx of online traffic, Yelp gains a wealth of collected data on its users, ranging from personal attributes (age, gender, location, etc.) to consumer behaviors. Access to this kind of data is invaluable to a company's success in today's day and age. Paired with machine learning, it enables companies to keep up with the advancements in technology and retain consumers.

One machine learning method that has helped many companies surpass their competitors and become powerhouses in their respective sectors is recommendation systems. Recommendation systems scan through large volumes of dynamically generated information to provide users with personalized content and services (Isinkaye, 2015). In this paper, we will use a recommendation algorithm on the Yelp dataset to provide users with suggestions of restaurants based on their previous reviews.

This research investigates how to create a recommendation algorithm to suggest a restaurant to a user based on their past restaurant reviews. In essence, the successful algorithm will consider reviews in which the user has rated restaurants favorably, assess the attributes of those restaurants, and recommend a new restaurant with similar features.

For companies like Yelp, there are several motivating reasons to engage in machine learning algorithms. For example, using a recommendation algorithm is a valuable enhancement that helps companies distinguish themselves from their competitors. It provides consumers with a customized experience targeted to their user needs and preferences. As a result, it increases consumer engagement and more significant usage and activity. It is also critical in client retention. With so many companies using machine learning algorithms to improve customer experiences, those who do not use machine learning may unable to compete.

Yelp is also a medium for advertisements from other businesses. Therefore, high volumes of user activity are an asset to the company. The more visits or clicks generated on Yelp, the more valuable their digital advertisement real estate becomes. For example, suppose a local restaurant wishes to reach a broader audience and bring in more customers. In that case, it is wiser to spend their advertising dollars and efforts on a website that receives one million clicks a day rather than a website that receives 250,000 clicks a day. The ability of Yelp to attract sponsors and sell advertisements is crucial for the company to diversify its revenue streams.

Netflix is a prime example of a company that has experienced a great deal of success with the help of a recommendation algorithm. Netflix is a media-services provider and production company. They are a subscription-based streaming service that offers a library of films and television programs and their own produced films and shows. Netflix utilizes a recommendations system that estimates the likelihood that a user will watch and enjoy a movie or show based on the following: 1) the subscriber's interaction with the service (viewing history and ratings on previously watched titles), 2) other subscribers with similar preferences, and 3) information about the titles (genre, actors, release year, etc.) (Help Center, 2019).

Examining the media services industry over the past several decades, companies like Blockbuster and Redbox could not keep up with the evolving enhancements that a media streaming service can. Blockbuster and Redbox have limitations, such as a slower collection of data, inability to learn and understand their customers, and turn around a new recommendation to secure their patronage timely and efficiently. Companies have turned to using machine learning algorithms to ensure the health and a competitive position in the market. For Yelp to maintain their distinction over competitors like Zagat and TripAdvisor, they also need to embrace machine learning algorithms.

The rest of the paper is organized as follows: Section 2 details the materials and methods employed in this study. Section 3 present the results from this study and discuss our findings. Finally, Section 4 concludes the paper and outlines the future direction of our research.

MATERIALS AND METHODS

To investigate the research question - recommending a restaurant to the user based on the past reviews, we started the analysis and data exploration on the Yelp open dataset (available on the Yelp website). The Yelp dataset is a subset of businesses, reviews, and user data for use in personal, educational, and academic purposes, available as JSON files. This dataset consists of multi-millions of the users, businesses, reviews, check-in details, tips, and photos. For this study purpose, we focused upon businesses, users, and reviews. Further, without impacting the scope, scale down the volume by focusing solely on the businesses in one city. Ultimately, Pittsburgh was chosen as the city based on the relatively large number of Pittsburgh restaurants included in the data. We limited to restaurants in Pittsburgh, the reviews of those Pittsburgh restaurants, and the users who left those reviews. Rather than cutting down the volume randomly in all the key datasets, this approach allowed us to resolve the volume dilemma while ensuring the logical grouping remained intact across businesses, users, and reviews.

Next, we discuss the data overview adopted in this study.

Data Overview

The complete Yelp dataset is relatively large and includes over 6.5 million reviews and 192,609 businesses over ten metropolitan areas. It also includes user data. Yelp also offers data on 200,000 uploaded photos, but the images were not necessary for purposes of our analysis and algorithm creation. The overall dataset is organized amongst several JSON files. We combined information from the business, review, and user files. The tables below show the number of businesses in various U.S states and cities and the specifics around Pittsburgh, the city chosen for our analysis.

Table 1. Data Overview

U.S States with over 1,000 businesses

State	Businesses
Arizona	56,686
Nevada	36,312
North Carolina	14,720
Ohio	14,697
Pennsylvania	11,216
Alabama	8,012
Wisconsin	5,154
Illinois	1,932
South Carolina	1,162

U.S Cities with over 5,000 businesses

City	Businesses
Las Vegas, NV	29,361
Phoenix, AZ	18,764
Charlotte, NC	9,507
Scottsdale, AZ	8,837
Calgary, AB	7,735
Pittsburgh, PA	7,016
Mesa, AZ	6,080

Observations in Pittsburgh Restaurant subset

Restaurants	3,124
Reviews	170,975
Users	54,637

Data Pre-Processing

Although the scope of this study is limited only to Pittsburgh restaurants, a successful algorithm in one metropolitan area can be expanded to the full data set. We utilized various packages and functions to subset our data relevant to Pittsburgh businesses. SQL code from the "sqldf" package and data manipulation functions from "dplyr" were used. Furthermore, we utilized a combination of the "dplyr" and "data.table" packages to select only those businesses which included the character string "Restaurants" and "Food" within the "categories" variable in the dataset. This ensured that non-restaurant businesses, which are also present in Yelp data, were not included in our analysis. This created three new data frames, which we combined into one. Additionally, we discovered duplication in the restaurant data, where a single business I.D. was associated with multiple rows in the data. To address this, we removed all duplicate restaurants by searching and keeping only the unique or distinct businesses (by business I.D.).

At the beginning of our data exploration, one of the goals was to understand how the users' star ratings were distributed among the business they reviewed. In figure 1, we observed far more favorable (defined as 4+ star) reviews than there are neutral or unfavorable ones. While users give more favorable reviews, we notice in figure 2 that the majority of businesses hold a review score between 3 and 4.5 stars. For comparing the star rating between user and business, we rounded the business reviews to the nearest whole number as observed in figure 3. This removes review score accuracy, but we do see an interesting change in the distribution. With this change, we see that most reviewed businesses hold a star score of 4.

Aside from understanding these distributions, these star scores will ultimately be used to help recommend restaurants to users. In addition, to review the score, other variables which may be substantive in a user's likelihood to visit and ultimately review a restaurant will also be included and discussed in detail in later sections.

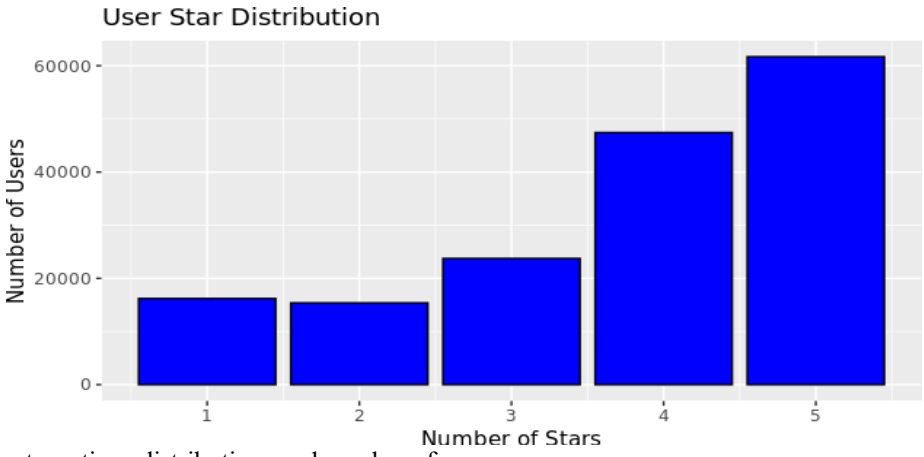

Figure 1. Users star ratings distributions and number of users

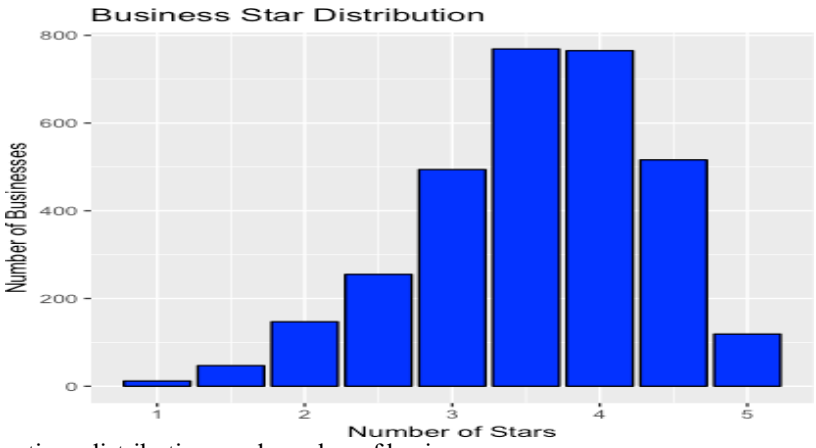

Figure 2. Users star ratings distributions and number of businesses

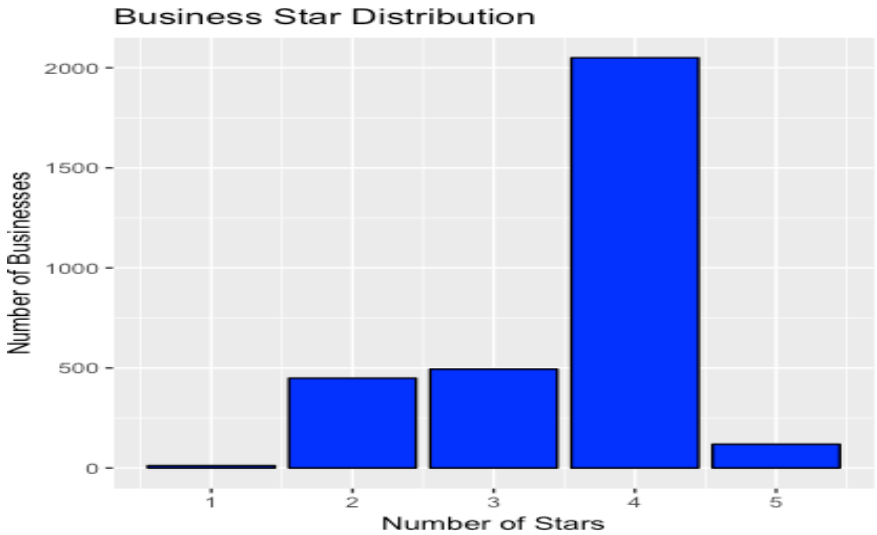

Figure 3. Normalized users star ratings distributions and number of businesses

Process Overview

After the data pre-processing was complete, we began the algorithm development process by first creating a clean dataset containing only the valuable information in answering our research question. We utilized the following variables from the review dataset: user ID, business ID, and the user's impression or rating of the restaurant. The star ratings are on a scale of 1-5, for this study purpose 4 or 5 star rating on a restaurant is a favorable impression, and therefore, assigned the restaurant a value of 1. Ratings of 3-stars and below were unfavorable impressions, and therefore, received a value of -1. We categorized all ratings into two groups. In figure 4, you see the distribution of the star ratings into these two groups (-1 and 1).

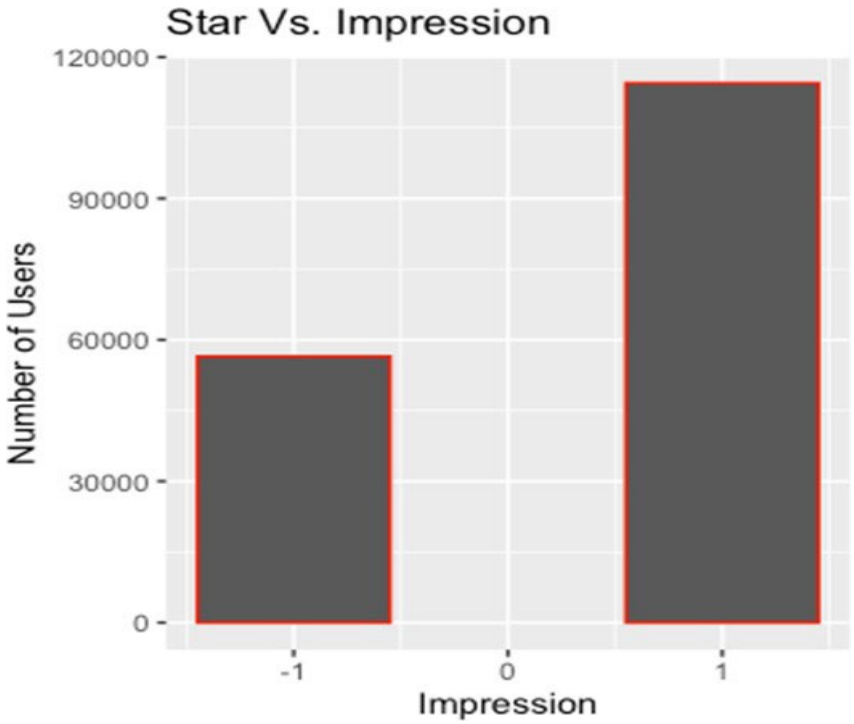

Figure 4. distribution of the star ratings into two groups (-1 and 1)

Next, we created a subset from the restaurant dataset that includes only the variables or descriptors essential to complete a cluster analysis on the restaurants. In figures 5 through 7, the data distribution for some of these attributes or variables has been presented: favorable for kids, offers take-out, and price range. Variables included in identifying clusters were the types of cuisine that the restaurant offers. By using this unsupervised learning method, restaurants that contain similar features will be sorted into clusters, or groups. For example, if a user's rating history informs the machine learning algorithm that they enjoy Mexican restaurants, other Mexican restaurants will be apparent through cluster analysis. More specifically, that cluster will include restaurants such as Chipotle, Moe's, and Mexican Mariachi.

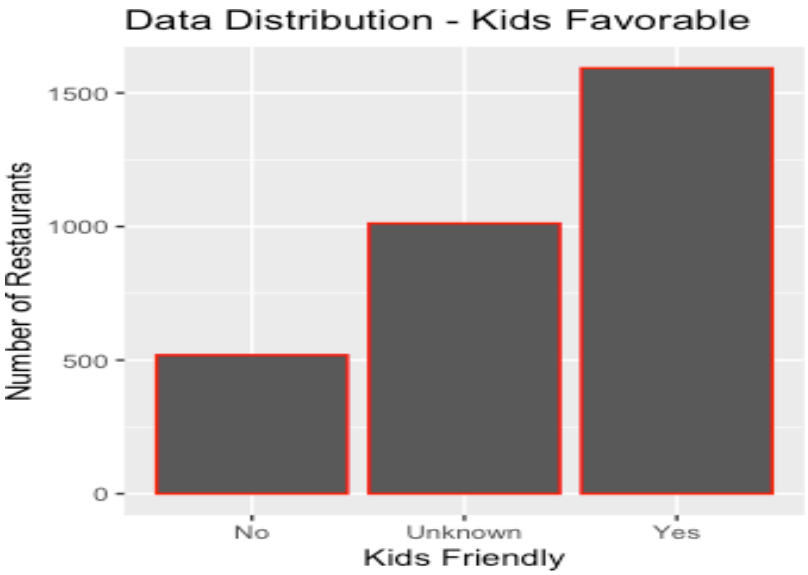

Figure 5. data distribution - Kids Favorable

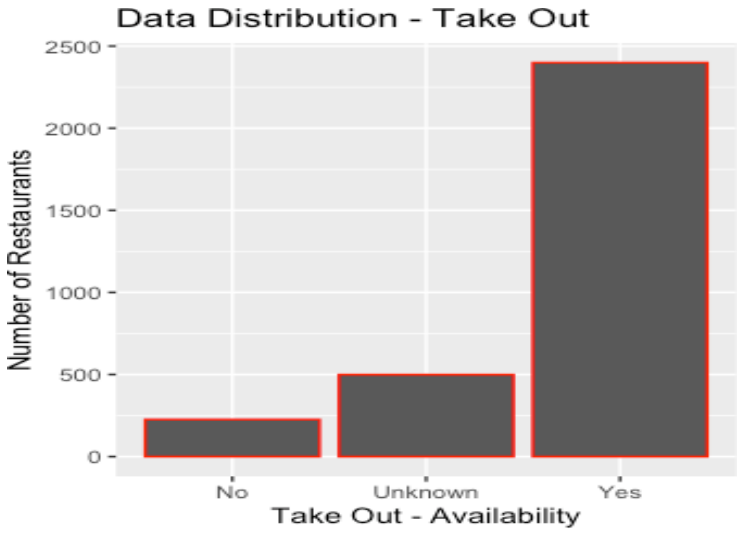

Figure 6. data distribution - Take Out

Figure 7. data distribution - Pricing

RESULTS AND DISCUSSION

There are several types of cluster analysis. We used Partitioning Around Medoid (PAM), an iterative clustering procedure very similar to K-means clustering. In PAM clustering, we select k medoids and assign every observation (or in this case restaurant) to its closest medoid. Within each formed cluster, the observation with the lowest average distance becomes the new medoid. The procedure repeats until the medoids are consistent. The benefit of PAM clustering over other clustering algorithms is that it provides the ability to input a custom distance matrix. Most clustering algorithms, such as K-means, generate a distance matrix as part of the algorithm itself. Unfortunately, these in-algorithm distance matrices, which are ultimately used to group together the observations, can generally only be created for qualitative data.

Given that the restaurant attributes contain both categorical and numerical data types, an alternate solution needed to be identified. We have employed Gower's distance formula can be used to create a distance matrix on qualitative and quantitative data. Because of PAM's ability to read in this custom Gower distance matrix, it is ideal for this analyzing this particular type of dataset.

In PAM clustering, the best number of clusters to select is determined based on silhouette width. Silhouette width, which equals 1 - the total calculated distance between clusters, is better at values closer to one. Figure 8 shows the various silhouette widths obtained at different cluster counts. Given the consistently high silhouette widths when the cluster count increases, 10 was ultimately selected for the number of clusters.

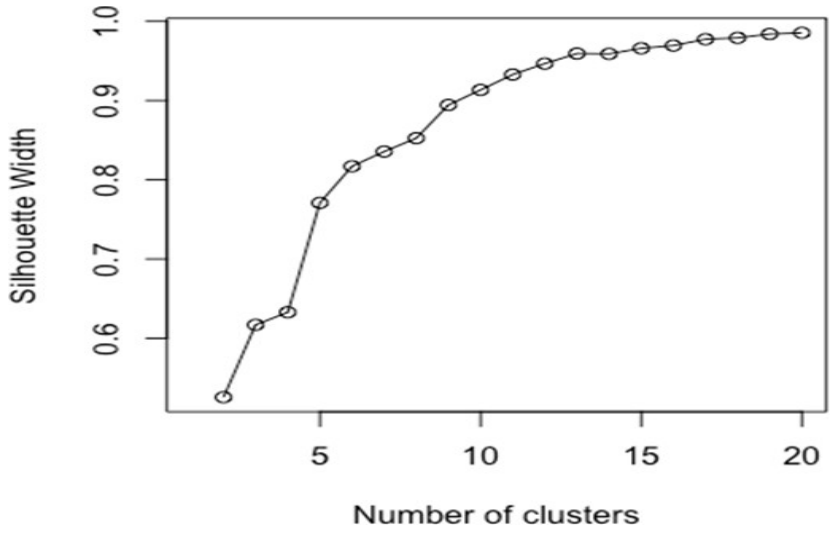

Figure 8. Silhouette widths obtained at different cluster counts

After the groupings of restaurants were identified, we assessed in which clusters each user had the highest count of favorable impressions. The algorithm takes the summation of positive ratings and compares each cluster's count of positive ratings for a specific user. The goal is to identify which restaurant cluster resonates most with the user based on previous ratings. For example, in the table 2 below, User A had a favorable impression on 1 restaurant in cluster 1, 3 in cluster 2, 2 in cluster 3, and 1 in cluster 4. Cluster 2 contained the greatest number of restaurants that User A rated favorably.

Table 2. Users' favorable impression

User	Cluster 1	Cluster 2	Cluster 3	Cluster 4
A	1	3	2	1
B	2	1	1	3

Lastly, we created a table that included all users alongside any of the highest-rated, open restaurants within their clusters that they have yet to review. The assumption is that the user has not visited these restaurants that contain similar attributes to other restaurants they rated favorably. From this, we run a function that randomly selects one restaurant to recommend from this cluster. By inputting the user ID, the function assesses the restaurants the user has not visited within its prospective cluster, and the output is one of them. Because the function randomly selects a single restaurant from possibly dozens of potential suggestions, results will differ if it is run repeatedly for a single user.

CONCLUSIONS

Recommendation algorithms are immensely beneficial to companies looking to increase engagement amongst their consumer population. However, there is also the need for constant updates and future enhancements. In our paper, we focused on restaurants in Pittsburgh (a subsection of the Yelp dataset). A motivated business can optimize this model by using all the files and employing the recommendation algorithm across all the cities within the dataset. This enhancement would allow engagement for users who travel across the U.S. by making recommendations on restaurants in a new city.

Additionally, the model can be improved by including additional restaurant attributes that were excluded from our algorithm. Some of these attributes were intentionally omitted from our algorithm because there were too many observations with missing values in that variable. For example, many observations did not report on whether or not a restaurant was considered "pet-friendly." In many cases, this attribute may not be relevant to that particular restaurant or observation. In other circumstances, the attribute was not collected in the dataset. Therefore, the first step in developing a richer abundance of attributes is to further the data collection process. Ultimately, additional features allow for better and more effective clustering analysis, with more individualized and unique clusters. This enhancement would allow for a more specific and accurate restaurant recommendation.

A larger necessary enhancement for this algorithm to be adopted would be technical integration with the Yelp mobile application. While the function runs quickly and successfully in R, significant software development would be needed to make it operational for a Yelp user in real-time. Conceptually, though, the process of making recommendations to users based on restaurant clusters is simple, efficient, and logically sound, and the work to deploy it within the application would be worthwhile.

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THE IMPACT OF AACSB ACCREDITATION ON FRESHMEN AND TRANSFER ENROLLMENT: A PRELIMINARY STUDY

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ABSTRACT

The Association to Advance Collegiate Schools of Business (AACSB) is the world's largest business education association. Its mission is to "foster engagement, accelerate innovation, and amplify impact in business education," which is aligned to its vision of "transforming business education globally for positive societal impact" (www.aacsb.edu), retrieved September 14, 2021). With less than 5% of the morethan 16,000 business schools worldwide earning this prestigious accreditation, those business schools with AACSB accreditation should have a competitive advantage with regard to recruitment of freshmen students.

This study provided a preliminary analysis into the impact of AACSB accreditation on the recruitment of freshmen and transfer students at two public universities in similar rural locations. For the first universityunder study, it evaluated the pre-accreditation recruitment results stratified by academic years for the immediate previous years leading to the accreditation, and then statistically compared the results to available years post-accreditation, as percentages of total university enrollment. For the second universityunder study, a snapshot of its enrollment pre and post accreditation is provided, as the timeframe from accreditation does not yield enough data for statistical analysis at this time.

We hypothesized that, for this case study, the AACSB accreditation will not have a significant role in and of itself on freshmen and transfer recruitment. In the analysis of the data, this hypothesis appears to be correct, as no significant increase in recruitment of freshmen or transfers was noted. Further study is warranted, including marketing efforts and student awareness of accreditation as well as a larger scope of study.

INTRODUCTION

College enrollment has been on the decline since 2012 (Nadworthy, 2021). Add to that trend the COVID-19 pandemic, and colleges face a real disaster. Indeed, the National Student Clearinghouse Research Center (NSCRC) in its final report including spring 2021 indicated that enrollment is down 3.5% from the previous year. This drop represents 600,000 students from one year ago (Nietzel, 2021). This drop is attributed to almost entirely undergraduate students, while graduate enrollment actually increased (Nietzel, 2021). It is unclear if these undergraduate students are lost to collegiate education or simply taking a break until COVID-19 subsides. Nevertheless, the declining trend will probably continue,as it had prior to the pandemic.

With such dire enrollment data, colleges must search for ways to recruit and then retain students. One mechanism a college might pursue for recruitment is specific program accreditations, such as that granted by the Association to Advance Collegiate Schools of Business (AACSB). Considered a prestigious business school accreditation, it accredits only 5% of more than 16,000 business schools world-wide.

However, AACSB accreditation is a costly endeavor, with initial fees costing approximately $30,000 and yearly fees in the thousands (AACSB, retrieved September 14, 2021). Thus, with budgets constrained and enrollment trending downward, the monetary investment for AACSB accreditation should provide some sort of recruitment return.

This study seeks to understand the value of the AACSB accreditation as it impacts recruitment of freshmen and transfers, with particular attention to four-year rural institutions, as the economic conditions of such institutions present particularly challenging factors. This study evaluates the accredited units of marketing, finance, management, accounting and accountancy within two similar rural colleges at the undergraduate level. This research is important as it may assist such colleges with perspective with regard to budget allocation. The research is case study in nature. It begins with a literature review providing insight into the benefits and detractions of AACSB accreditation, which assists in the framing of the hypothesis and research questions. Methodology is presented, followed by results. A discussion of the results is then provided; the study concludes with noted limitations and further research.

LITERATURE REVIEW

Work by Trifts (2012) sought to identify both the direct and indirect effects of AACSB accreditation. In general, most professionals, regardless of industry, believe that accreditation provides an outward symbol of quality. Indeed, if a college is prestigiously accredited, then it follows that better, more qualified students will enroll. However, Trifts (2012) notes that little data exist to suggest that accreditation facilitates the recruitment of students. A study by Hunt (2015) concurs, as does a study (Doh et al, 2018) of enrollment at historically black colleges and universities (HBCUs), which found that AACSB accreditation did not lead to higher enrollment at HBCU business schools.

Further, though accreditation may provide evidence of a high-quality program, other factors influence the decision of where to attend college; students may look for more of a perceived "fit" more than anything else (Trifts, 2012). Additionally, in terms of recruitment, undergraduates and parents may not understand the difference between specialized and institutional accreditation (Trifts, 2012), thereby leading undergraduates and parents to be satisfied with institutional accreditation. A 2011 report by Longmire and Company detailed how parents look at colleges and what traits seem most important to them in making a decision. Students and parents most strongly agreed that "general attributes of the college" are important, but it is not clear what those attributes actually are. Additionally, when parents are interested in a university and want to guide their child toward a specific one, 17% will mention the college's attributes, which appear to be related to a university's overall kindness—how communicative they are, how much information they receive, how personalized their interactions feel. Based on these data, it appears to be difficult for academic institutions to win over any parents or students who feel they did not receive quality 'customer service' and that is by far the most important characteristic. In fact, 8 of the 10 factors that would cause immediate rejection of a university are related to "customer service" and not accreditation.

In terms of students, a 2009 presentation by Lipman Hearne, Inc. looked at high-achieving high school students and their decisions with regard to selecting a college. Students were asked to identify the college features and factors that "closed the deal" and which ones did not. This study looked at 29 different college attributes that may be important to students when selecting programs. In general, students' value high quality programs (about 27%) and about 15% noted the reputation of the program as being important. Overall, students said the "prestigious reputation of the college/university" was "very important." Reputation of the university was more important than location and cost; reputation of the major was more important than location. Overall, the reputation of the school and reputation of the program both mattered. However, notably, it is not clear how reputation is determined, for example, as accreditation.

From an employer perspective, there are beliefs that AACSB will add more prestige to a program, and thus to a graduating student, and make them more marketable for hire. However, it was found that the majority of employers were not familiar with AACSB or did not consider it important; only 36% of employers noted AACSB accreditation as being a benefit for an applicant (Hunt, 2015). However, the majority of CEOs appear to have undergraduate and graduate degrees from AACSB-accredited schools (Hunt, 2015).

While external benefits are not totally clear, accreditation would lead to obvious internal improvements. Accreditation is a rigorous process with specific, sometimes complex and usually expensive requirements (Trifts, 2012). As a result, there is a chance for specialization, improved facilities, better faculty, and overall better coursework/satisfaction. Additionally, there appears to be a clear benefit to AACSB accreditation in attracting higher quality faculty (Hunt, 2015). An earlier study by Lindsay and Campbell (2003) found that faculty research and resources were positively associated with accounting education outcomes in AACSB accounting programs.

Romero (2008) argues that AACSB is overall beneficial for business education. Romero contends that AACSB facilitates strategic performance; however, the author recognizes a lack of systematic/peer reviewed data to confirm this contention. The notable benefit of accreditation is its ability to gain the notice of international students, who may seek to study abroad and are looking for some assurance of quality (Romero, 2008). The favorable view of AACSB accreditation of Romero is consistent with the work of Trapnell (2007) who contends that AACSB accreditation provides outward evidence that an institution is committed to consistent improvement and high-quality education, which has benefits for the stakeholders in the college's business education.

The process of consults, reviews, faculty involvement, renovations and potential overhaul of programs are not cheap. Attracting better faculty typically means higher pay, and starting new programs or courses means spending more money, time, and resources (Tullis and Camey, 2007).One study noted by Trifts (2012) found costs ranged from $142,250 to $800,000 just to hire new faculty. In general, it is estimated that even some of the better prepared schools should be expected to be in the process of accreditation for three years and sometimes as many as 10 (Trifts, 2012).

PURPOSE AND RESEARCH QUESTIONS

The purpose of this study is to examine the role of AACSB accreditation as it relates to recruitment of freshmen and transfer students at two rural, similar universities. We hypothesize that the AACSB accreditation does not have a significant role in and of itself on freshmen and transfer studentrecruitment. To challenge our hypothesis, the following research questions (RQs) will be evaluated with regard to the first university under study:

What is the % of incoming freshmen to the accredited unit (AU) as a function of theincoming freshmen to the college over years prior to accreditation?

What is the % of incoming transfer students to the accredited unit (AU) as a function ofthe incoming transfer students to the college over years prior to accreditation?

What is the % of incoming freshmen to the accredited unit (AU) as a function of theincoming freshmen to the college over years post-accreditation?

What is the % of incoming transfer students to the accredited unit (AU) as a function ofthe incoming transfer students to the college over years post-accreditation?

Does a statistical difference exist between RQ 1 and RQ 3?

Does a statistical difference exist between RQ 2 and RQ 4?

What is the data movement of all incoming freshmen and transfer students as apercentage function of total college enrollments over time?

With regard to the second university under study, limited data are available, as that universityrecently achieved AACSB accreditation. Thus, for that university, a snapshot of the data movement is provided, answering the following RQ (8):

Has the AACSB accreditation resulted in an increase or stabilization of the freshmenor transfer recruitment for the second university under study?

METHODOLOGY

To answer the research questions, enrollment data were pulled from each college-under-study's respective administrative departments. The data were analyzed using t-tests and box plots as well as statistical process control charts for the first university under study. Because of the limited data available for the second university under study, no clear conclusions were drawn, but rather possible conclusions were offered resulting from the snapshot of data available.

For the first college-under-study, data were available for analysis for academy years beginning in fall 2012 and extending through fall 2021. The year of accreditation for this subject is fall 2017. For the second college-under-study, data were available for fall 2020 (the university was accredited January 2021) as compared to enrollment in fall 2021. In terms of the first college-under-study, research questions 5 and 6 were able to be answered through the administration of ANOVA using data from research questions 1 and 3, and 2 and 4, respectively.

Research question 7 was also able to be illustrated using control charts, specifically the individual moving range charts.

In terms of the second college-under-study, research question 8 is presented in table form. The table provides a summation of the current state of enrollment in terms of freshmen and transfer students as a function of population of those demographics, before and after accreditation.

RESULTS

Research Question 1: *What is the % of incoming freshmen to the accredited unit (AU) as a functionof the incoming freshmen to the college over years prior to accreditation?* The data for the first college under study determined the following results, as shown in Table 1: % of Freshmen Enrolled in the AU as a Function of All Freshmen Prior to Accreditation:

Table 1:

Fall Semester	% of Freshmen to AU as a function of allFreshmen
2012	11.86
2013	12.45
2014	11.81
2015	12.48
2016	12.55
2017	11.5

NOTE: Fall 2017 is year of accreditation

The data above indicates that the average % enrollment of freshmen in the AU as related to theoverall freshmen census over the period of time leading to accreditation is 12.12%.

Research Question 2: *What is the % of incoming transfer students to the accredited unit (AU) asa function of the incoming transfer students to the college over years prior to accreditation?* The data for the first college under study determined the following results, as shown in Table 2: % ofTransfers Enrolled in the AU as a Function of All Transfers Prior to Accreditation:

Table 2:

Fall Semester	% of Transfers to AU as a function of allTransfers
2012	14.68
2013	17.11
2014	16.6
2015	15.54
2016	15.52

2017	15.23

NOTE: Fall 2017 is year of accreditation

The data above indicates that the average % enrollment of transfers in the AU as related to theoverall transfers census over the period of time leading to accreditation is 15.78%.

Research Question 3: *What is the % of incoming freshmen to the accredited unit (AU) as a function of the incoming freshmen to the college over years post-accreditation?* The data for thefirst college under study determined the following results, as shown in Table 3: % of Freshmen Enrolled in the AU as a Function of All Freshmen Post Accreditation:

Table 3:

Fall Semester	% of Freshmen to AU as a function of allFreshmen
2018	10.81
2019	10.73
2020	11.45
2021	12.06

The data above indicates that the average % enrollment of freshmen in the AU as related to theoverall freshmen census over the period of time post accreditation is 11.26%.

Research Question 4: *What is the % of incoming transfer students to the accredited unit (AU) asa function of the incoming transfer students to the college over years post-accreditation?* The data for the first college under study determined the following results, as shown in Table 4: % ofTransfers Enrolled in the AU as a Function of All Transfers Post Accreditation:

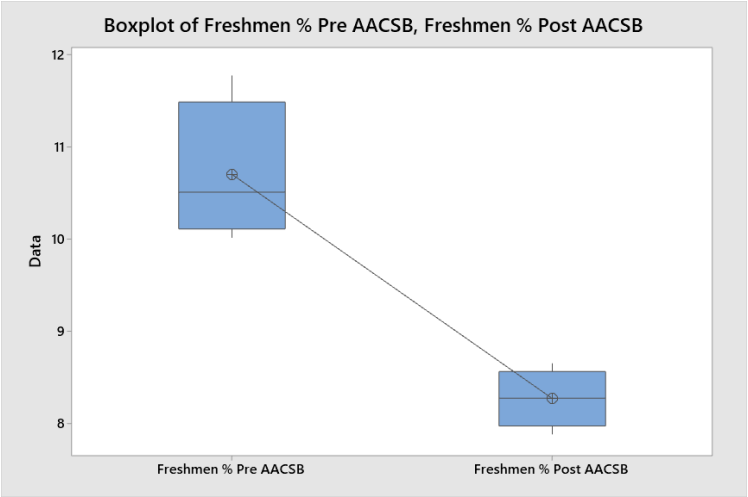
Table 4:

Fall Semester	% of Transfers to AU as a function of all Transfers
2018	15.9
2019	13.66
2020	11.72
2021	11.72

The data above indicates that the average % enrollment of transfers in the AU as related to theoverall transfers census over the period of time post accreditation is 13.25%.

Research Question 5: *Does a statistical difference exist between RQ 1 and RQ, that is, does a difference exist between freshmen enrollment as a percentage of total freshmen enrollment pre and post accreditation?* A two-sample t-test was performed, along with a box plot, to evaluate the data for differences. The results are found in Figure 1: Freshmen Enrollment as a Percentageof Total Freshmen Enrollment Pre and Post Accreditation.

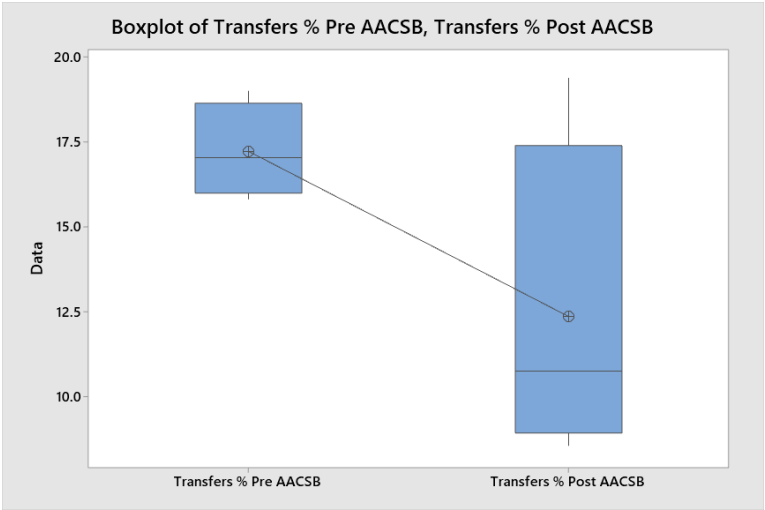
Figure 1



The two-sample t-test demonstrated a statistically significant difference at the 95% confidence interval, with a p value of 0.004. Although again the sample size is small, the data do suggest asignificant decline in freshmen enrollment.

Research Question 6: *Does a statistical difference exist between RQ 2 and RQ 4, that is, does a difference exist between transfer enrollment as a percentage of total transfer enrollment pre andpost accreditation?* A two-sample t-test was performed, along with a box plot, to evaluate the data for differences. The results are found in Figure 2: Transfer Enrollment as a Percentage of Total Transfer Enrollment Pre and Post Accreditation.

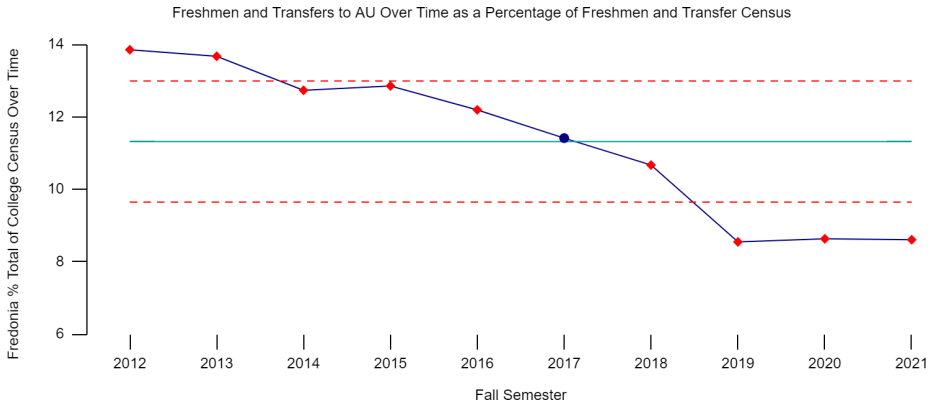
Figure 2



The two-sample t-test indicated that no differences were found; however, the sample size is quitesmall, and the box plot may be a stronger indicator of AACSB impact on transfer enrollment to the AU.

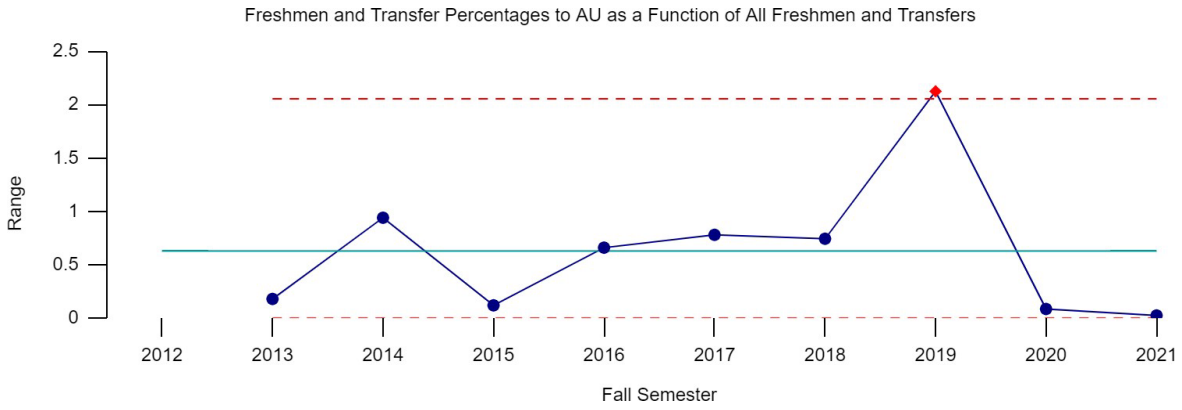
Research Question 7: *What is the data movement of all incoming freshmen and transfer studentsas a percentage function of total college enrollments over time?* To evaluate this question, the data over time were represented using a X and mR charts, a statistical control chart duo that allows one to evaluate not only specific data points, but also variation over time. These are represented as Figures 3a and 3b: Freshmen and Transfers to the AU Over Time as a Function ofFreshmen and Transfer Census.

Figure 3a:



This Figure 3a illustrates the increasing downward trend of enrollments to the AU with regard totransfers and freshmen. Some stabilization appears to be occurring at year 2019 through 2021.

Figure 3b:



The moving range chart (Figure 3b) illustrates instability from 2018 through 2019. This indicates that some catalyst occurred in 2019 that impacted variation. In evaluating this chartwith Figure 3a, that impact was negative with regard to percentages of enrollment.

Research Question 8: *Has the AACSB accreditation resulted in an increase or stabilization of thefreshmen or transfer recruitment for the second university under study?* To evaluate this question, data were collected from the university's institutional research department. The data are presented in Table 5: *Comparison of % of Freshmen and Transfers Enrolled in the AU as a Function of All Freshmen and Transfers Pre- and Post-Accreditation:*

Table 5:

Fall Semester Academic Year	*2020 (Accredited January 2021)*	*2021 (First Year of Accreditation)*
Total Freshmen Enrolled at the University	1463	1370
Total Transfers Enrolled at the University	467	535
# of Freshmen Enrolled in the Accredited Unit	65	65
# of Transfers Enrolled in the Accredited Unit	65	57
% of Freshmen Enrolled in Accredited Unit asFunction of Total Freshmen Enrolled at University	4.44	4.74
% of Transfers Enrolled in Accredited Unit asFunction of Total Freshmen Enrolled at University	13.9	10.65

DISCUSSION

The results of this study appear to support the findings of previous studies in that no appreciable increase in enrollment resulted at either school under study post-accreditation. This finding is consistent with the works of Trifts (2012), Hunt (2015), and Doh et al (2018), who all concurred in their findings that little data exist to suggest accreditation facilitates the recruitment of students.

With regard to the work of Tullis and Camey (2007), as well as Trifts (2012), although monetaryand time resources are indeed engaged and expended for the purposes of accreditation, little pay off results. With regard to the results of this study, no return on investment (ROI) is notable for at least several years after accreditation.

LIMITATIONS, AND OPPORTUNITIES FOR FURTHER RESEARCH

This study serves to provide valuable insights regarding the association between AACSB accreditation and business program enrollment. However helpful in gaining new insights, no causal relationships can be made, and the case study format limits generalizability to similar institutions in comparative markets.

Enrollment data are examined to employ institutional enrollment as a control, but the design is limited by multiple factors that were not available. The study attempts to capture influences on enrollment associatedwith the institutions' recruitment strategies, competition, other relative characteristics, as well as broader demographic and economic conditions, by examining academic unit variation relative to the institution's total enrollment. However, this certainly limits more detailed analysis of additional variables that can directly influence enrollment at the academic unit level such as programmatic changes, staffing, allocation of marketing resource mix and comparative competitor program influence on the market.

While available data and the study population limit generalizability, initial findings will serve to provide key insights to the association between AACSB accreditation and business program enrollment. The preliminary findings will serve to inform future research including additional universities data and factorsthat may influence enrollment.

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ANALYSIS OF COVID-19 CASES BY ECONOMIC, HEALTH, EDUCATION AND RACE INDICATORS OF COMMUNITIES

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ABSTRACT

COVID-19 has been sweeping our globe. To keep track of all tests, positive cases, hospitalizations, recoveries, and casualties, researchers use data repository to collect, manage, and store data sets for data analytics. This research attempted to find out how Covid-19 is affecting communities by their healthcare coverage, and economic status as measured by household income, poverty status, economic vulnerability level, race, and other economic. The main research question was, have communities with majority people of color, a high poverty rate, and a high number of people without health insurance been highly impacted by COVID-19? The research used the Cross Industry Standard Process for Data Mining (CRISP-DM) methodology to gather, clean, and integrate data from several sources, and then assess, design, and develop interactive data analytic results in dashboard on Tableau public cloud. The analytics results reveal that higher COVID-19 positive cases are associated with communities with majority people of color, a high poverty rate, a high population density, and a high number of people without health insurance.

INTRODUCTION

The Covid-19 pandemic has altered almost all aspects of life as we knew it. The pandemic has also magnified many of the socioeconomic disparities in our society for centuries (Beyer, 2020). While the virus is affecting everyone, no one is being infected, more impacted than the black community, especially in the United States (Vasquez, 2020 & Plater, 2020). While the State of Maryland has the wealthiest per capita of black communities in America, like the national trend the community of colors is disproportionately impacted by COVID -19. In this study, we will take a deep dive into the problem using the data science and analytics method using the State of Maryland as a case.

COVID-19 affects many communities with different race, residency, economy, revenue, etc. Most research works are at Country, State and County level. This research focuses on communities at Zip code level of granularity. Community groups from lowest to highest as Block, Census Tract, Neighborhood, Zip Code, County, State, Country, and Continent.

The purpose of the research is to determine extent of Covid-19 cases in communities, study relationships between extent of Covid-19 cases with race, education, health care and economic indicators. The research questions are:

Do communities with more people of color have high positive cases?

Do communities/people without health insurance have high positive cases?

Do communities with high poverty rate have more cases?

Do communities with low education level have more cases?

Do communities with high population density have more cases?

We expected that communities without health insurance will be more likely to test positive for the virus. Second, for the State of Maryland, we expect that there will be a higher percentage of positive COVID cases among communities with Black majority. Third, high poverty areas/communities in Maryland will more likely have higher COVID case numbers than areas with low poverty. Fourth, we predict that lower-income Maryland households will have a higher rate of catching the virus than those above the median income. Lastly, areas in Maryland with high living density rates will be more likely to acquire the virus than low-density areas.

The paper is organized into six sections. Section 2 provides review of literature. Section 3 presents the methodology followed by results in Section 4. Section 5 presents conclusion and recommendation followed by limitations and future direction of the research.

LITERATURE REVIEW

Covid-19 is a worldwide pandemic that started in Wuhan, China, in 2019. Not only does Covid-19 itself cause death but, it is also putting considerable stress on health systems with large case numbers and the economy in general. Over the past year, vast health laws and vaccination campaigns have been set in place to mitigate the spread of the virus. While mitigation factors are in place, the National Institute of Health has highlighted that minorities and disadvantaged communities are less likely to adopt measures; due to historical issues related to trust in the health care system, economic circumstances, and the lack of quality healthcare accommodations.

Covid-19 has impacted the Black community significantly due to their association with underlying health conditions such as diabetes, heart, and lung disease (Samuels et al., 2020)—making Americans living in counties with above-average black populations three times as likely to die from the coronavirus as those in above-average white counties (Samuels et al., 2020)

While studying the effects of Covid-19, ICIC estimated that about 78 percent of high-poverty neighborhoods in the nation are highly vulnerable, but 15 percent of low-poverty communities are highly susceptible to the economic impact of the crisis (Eberhardt et al., 2020). Racial and economic segregation exists across the nation. ICIC uses its data to explain further how race plays a role in high poverty and economic vulnerability at national level. In the District of Columbia (DC), for example, the people of color accompany most high-poverty communities, which are highly vulnerable. Their analysis shows that 90 percent of high-poverty neighborhoods whose residents are primarily people of color are highly vulnerable (Finch & Hernández Finch, 2020). In comparison, only 56 percent of high-poverty tracts, at least 50 percent white, are highly vulnerable. Among low-poverty neighborhoods, 39 percent of those who are primarily people of color are highly vulnerable, compared to only 8 percent of those at least 50 percent white. Even though white people are in high-poverty neighborhoods, most of the space is for people of color (Finch & Hernández Finch, 2020). Almost all the residents of color are highly vulnerable compared to the whites, which only have a little over half of the neighborhood. Also, low-poverty, people of color reside in low-poverty areas, but most residents are white, and less than a tenth is highly vulnerable (Eberhardt et al., 2020).

METHODOLOGY

The research uses the CRISP-DM (Cross Industry Standard Process for Data Mining) methodology. This method is a well-proven, structured approach to planning and executing a data analytics and mining project. The six phases, presented in Figure 1, are Domain/Business Understanding, Data Understanding, Data Preparation/Feature Extraction, Modeling, Evaluation, and Deployment.

See figure below:

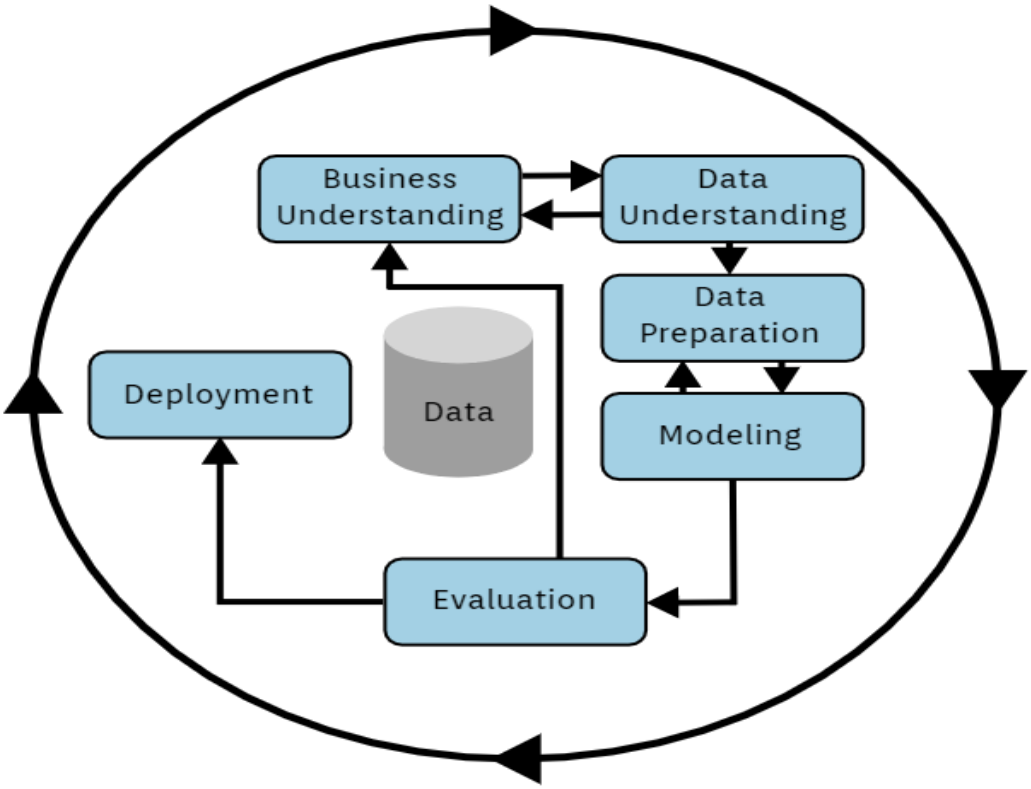

Figure 1. CRISP-DM (Cross Industry Standard Process for Data Mining)
(Source: https://www.oreilly.com/library/view/hands-on-artificial-intelligence/9781788836067/2a71e5a1-3efb-4da7-b5c8-39ab410f9cbf.xhtml)

DATA SOURCES AND FEATURES

Covid-19 data exists in various formats and with different features. Those features included total death by care facilities, total cases by race, total cases by ward, total deaths by age, total deaths by race, total deaths by sex, total deaths by ward, etc. Figure 2 presents the data sources: the U.S. Department of Housing and Urban Development's ZIP Code Crosswalk Files (https://www.huduser.gov/portal/datasets/usps_crosswalk.html), Maryland COID-19 cases by Zip code (https://coronavirus.maryland.gov/datasets/mdcovid19-master-zip-code-cases/explore) with three attributes: Object ID, Zip code, Total Positive Cases as of 7-17-2020, and American Community Survey (ACS) for the Economic, Health and Demographic Data (https://www.census.gov/programs-surveys/acs).

To access ACS data, we use https://www.arcgis.com/home/item.html?id=03b0f660a7a74719930e753428b5cfe2&view=list&sortOrder=true&sortField=defaultFSOrder#data. Figure 3 presents the attributes from these sources.

COVID-19 cases

HUD.GOV

Census Track to Zip Code – Crossover Table

American Community Survey 2018-
Economic Vulnerability Indicators

Figure 2. Data Sources

DATA CLEANING AND INTEGRATION PROCESSES

To integrate the economic and social indicators with the Covid-19 data, Tract-Zip code crosswalk is used. The data model for data integration is presented in Figure 3.

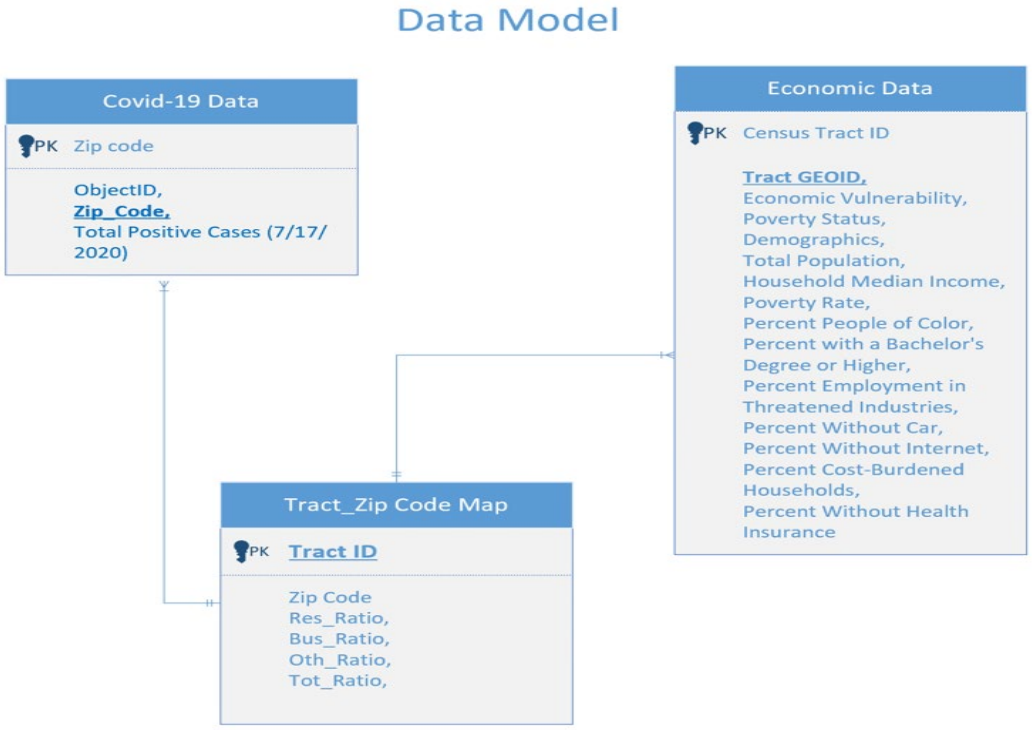

Figure 3. Covid-19 and Economic and Social Indicator Data Integration at Zip Code Level

Figure 4. The cleaning and joining process using Tableau Prep

Figure 4 shows the cleaning and integration of the data sources using Tableau Prep. The process started with inputting different data sets, each data set was individually cleaned by changing data types, removing unnecessary fields, and making the data easier to look at and be prepared to join in the next step. That next step included joining those two data sources using the ZIP Code Crosswalk File. We joined those two different data sources by a common field. Then, we added another clean step to get rid of the duplicated field, like two zip code fields and other fields that were not necessary for the analysis. Table 1 shows a sample of the final output data produced.

Table 1. Integrated COVID-19 and Economic, Education, Health and Demographic Data at Zip Code Level

ZIP Code	Tract GEOID	City	Econom	latitude	longitud	Total Po	Populati	Household	Percent	Percent	Percent	Percent	Percent	Percent Cost-Burdened House	Percent Without Health Insu
21202	24510110100	Baltimo	5	39.3	-76.61	377	22832	45607.73	0.685	0.403	0.238	0.438	0.299	0.411266667	0.061933333
21663	24041960800	Saint Mi	6	38.78	-76.22	18	3308	76088	0.135	0.452	0.262	0.026	0.17	0.272666667	0.035
20646	24017850904	La Plata	1	38.53	-76.97	189	18890	101217.1	0.42	0.265	0.187	0.027	0.178	0.311181818	0.041909091
21154	24025305100	Street	4	39.65	-76.34	15	6464	87452.2	0.037	0.249	0.222	0.035	0.191	0.2794	0.0382
21082	24005411201	Hydes	1	39.48	-76.47		654	116246.2	0.0604	0.4402	0.1794	0.0096	0.1062	0.2124	0.0226
21757	24021767600	Keymar	4	39.59	-77.26	38	3036	79238.25	0.07	0.208	0.2165	0.025	0.261	0.251	0.0685
20748	24033801801	Temple Hi	9	38.8	-76.94	632	38792	73408.3182	0.953864	0.208273	0.2715	0.117636	0.164364	0.379363636	0.083045455
21631	24019970200	East New	4	38.59	-75.92	12	2731	59176	0.2565	0.1675	0.224	0.0445	0.234	0.3175	0.0555
21771	24031700103	Mount Air	2	39.37	-77.15	270	29563	122327.4615	0.137231	0.394846	0.181615	0.022692	0.103769	0.235615385	0.034
21704	24021772200	Frederick	6	39.42	-77.41	126	13321	111590.25	0.340625	0.4515	0.194875	0.048875	0.103375	0.31325	0.047625
21223	24510180100	Baltimore	10	39.3	-76.61	360	26366	31698.2381	0.843143	0.118952	0.307381	0.459333	0.356619	0.450857143	0.079761905
21911	24015031400	Rising Sur	3	39.69	-76.06	143	11004	79786	0.0638	0.1884	0.2152	0.026	0.1858	0.2522	0.0414
20886	24031700812	Montgom	7	39.18	-77.19	672	33282	89256	0.7039	0.4095	0.2284	0.0733	0.1007	0.3568	0.1109
21286	24005490900	Towson	6	39.39	-76.62	180	19206	82659.4	0.338267	0.462267	0.2264	0.085733	0.123933	0.313	0.050133333
21220	24005451802	Middle Ri	5	39.33	-76.43	503	39199	66013.5833	0.28775	0.193167	0.247083	0.056667	0.169417	0.326916667	0.06325
21236	24005440400	Nottingha	2	39.38	-76.48	320	38474	79946.85	0.35315	0.3469	0.24115	0.04975	0.14055	0.2806	0.0407
20619	24037875600	California	1	38.29	-76.49	43	10503	100948.6	0.227	0.3742	0.1978	0.033	0.151	0.2474	0.0546
21230	24510240400	Baltimore	2	39.3	-76.61	420	33568	72744.3125	0.462938	0.443063	0.217438	0.227125	0.214063	0.3363125	0.058875
20879	24031700101	Gaithersb	1	39.14	-77.21	475	24360	98907.3529	0.662471	0.425176	0.218647	0.054765	0.099471	0.343882353	0.097411765
20877	24031700713	Gaithersb	10	39.14	-77.21	1037	34321	89842.0714	0.672143	0.402357	0.226857	0.101929	0.1595	0.387785714	0.1415
21722	24043010500	Clear Spri	7	39.65	-77.93	16	5545	60804.3333	0.136667	0.132667	0.278667	0.031667	0.272667	0.244666667	0.083
21144	24003740303	Severn	3	39.13	-76.69	283	31884	102470.5455	0.490545	0.359545	0.218909	0.041364	0.106455	0.307	0.044454545
21084	24025304101	Jarrettsvil	2	39.6	-76.47	33	7652	106774.2	0.0618	0.3552	0.1972	0.0318	0.138	0.2338	0.0336
21050	24025303300	Forest Hill	1	39.58	-76.39	182	18202	105900.8	0.0714	0.3711	0.2072	0.0258	0.1035	0.2333	0.026
21093	24005408800	Luthervill	3	39.43	-76.64	259	36465	110630.8	0.22655	0.60235	0.17485	0.05235	0.1107	0.2689	0.04185
21804	24045010400	Salisbury	7	38.37	-75.58	566	38491	55613	0.333857	0.2395	0.292	0.076429	0.242143	0.342071429	0.071428571
21133	24005402604	Randallstc	2	39.37	-76.8	551	29998	81592.25	0.849083	0.347083	0.22975	0.076	0.116	0.3245	0.05125

RESULTS AND DISCUSSION

There are 516 rows/observations for MD – zip code level COVID-19 data. There are 1,385 rows/observations for MD at Tract level economic, health and educational data. There are 172,122 rows/observations for USA – Tract level in the Tract-Zip code crossover file. The integrated data has 1,511 rows detailed at tract level, and 484 aggregated by zip code for MD. The results from applications of Visualizations using Tableau are presented online for interactive access on Tableau public at https://public.tableau.com/app/profile/azene.zenebe as well as presented and discussed as follow.

Figure 5 shows total positive Cases by Zip code with Household Median Income. Low median income (light blue color) communities have high positive cases (larger circle). Figure 6 shows Poverty Rate Compared to Positive Cases, where there is an increase in positive cases as the poverty rate increases. Figure 7 depicts the relationship between household median income and total positive cases. The analysis of data shows that in some instances those under the median income level had high cases but, there were other situations where those above the median income had a higher number of cases.

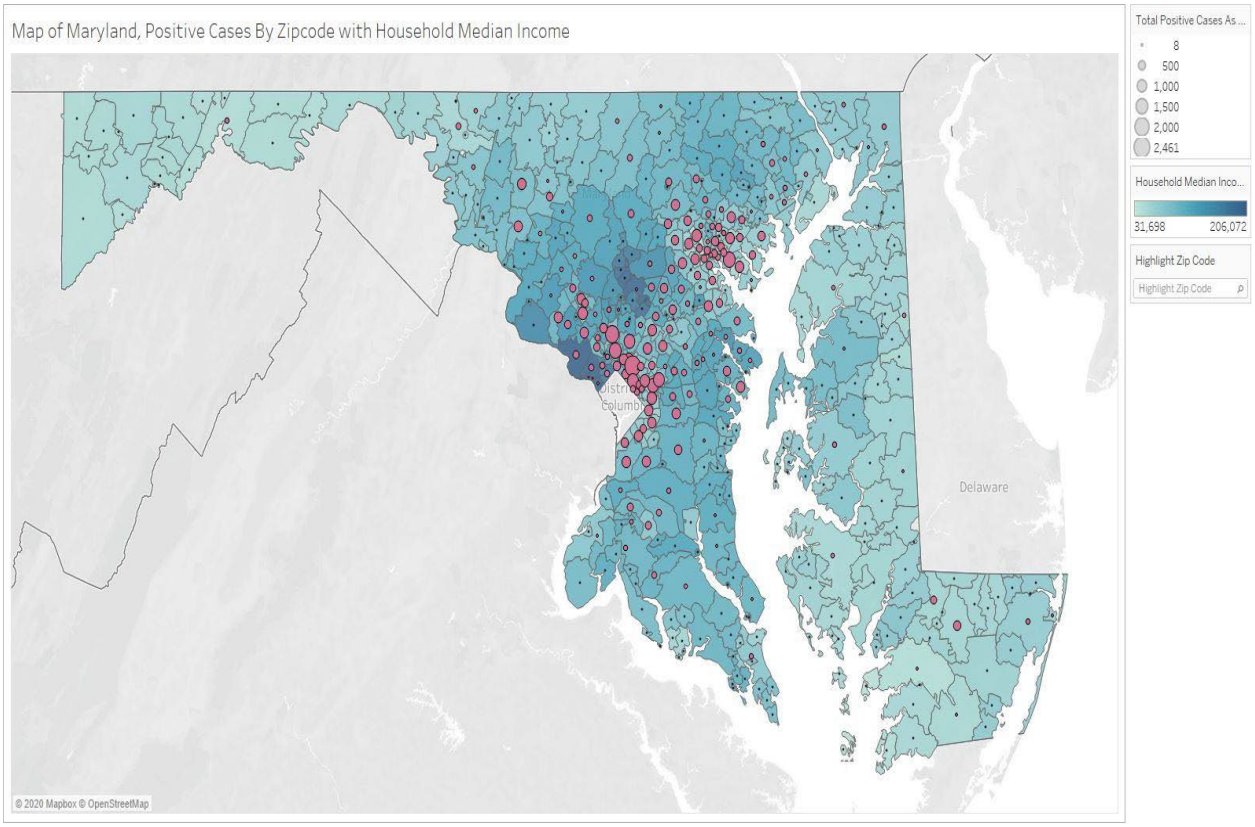

Figure 5. Positive Cases with Household Median Income by Zip code

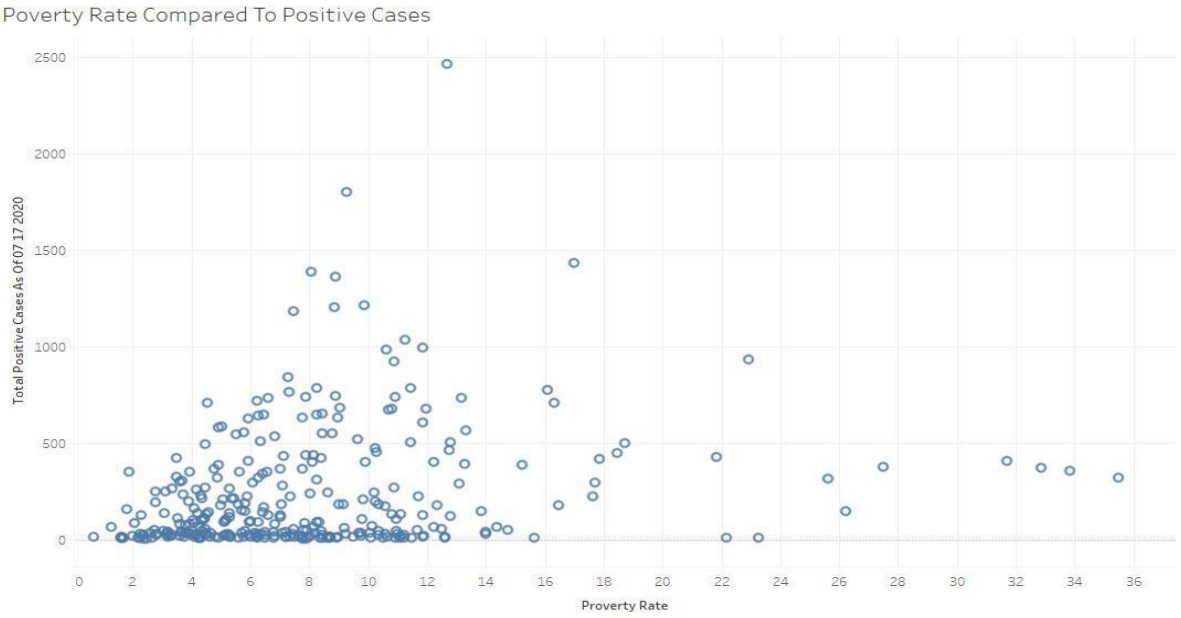

Figure 6. Poverty Rate Compared to Positive Cases

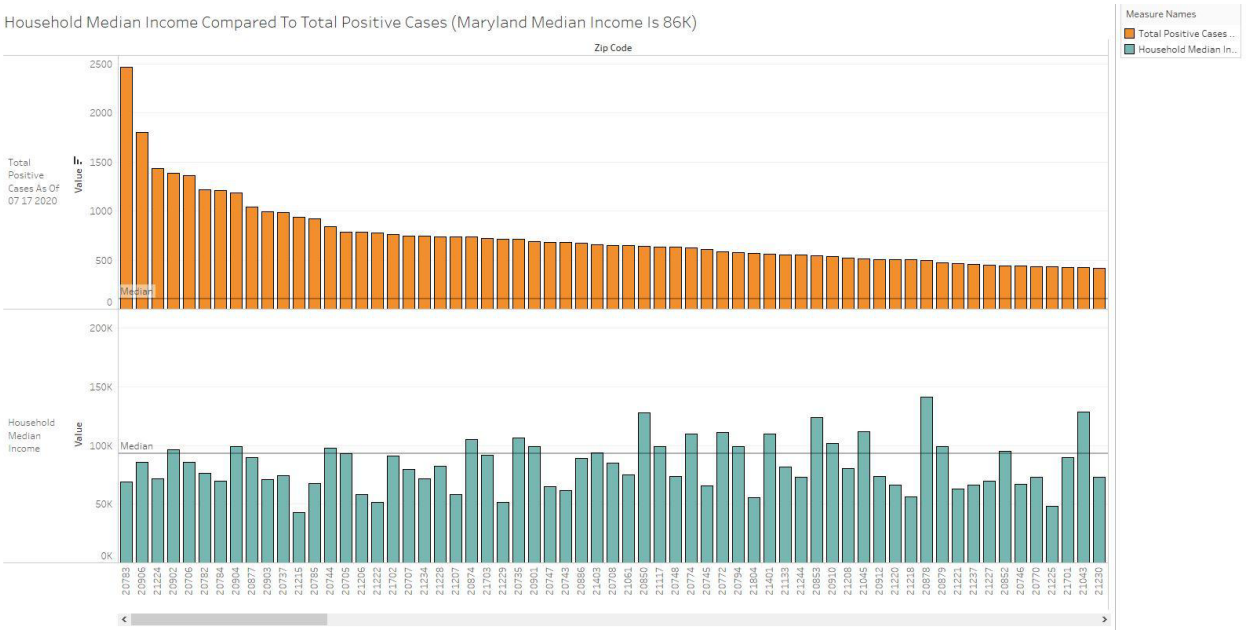

Figure 7. Household Median Income Compared to Total Positive Cases (MD Median Income = 86K)

Figure 8 shows the Percentage without Health Insurance Compared to Total Positive Cases, where there is an increase in positive cases as the uninsured rate increases. Figure 9 presents the Population size By Total Positive Cases for different communities at zip code level. Highly dense communities have higher positive cases; those with a larger population tended to average at 700 or more total positive cases.

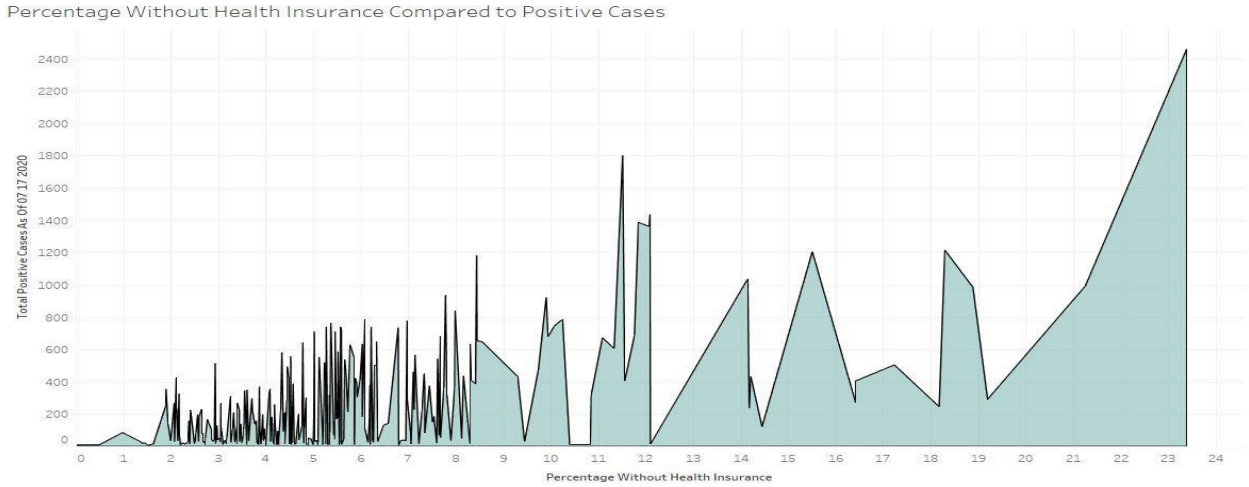

Figure 8. Percentage without Health Insurance Compared to Positive Cases

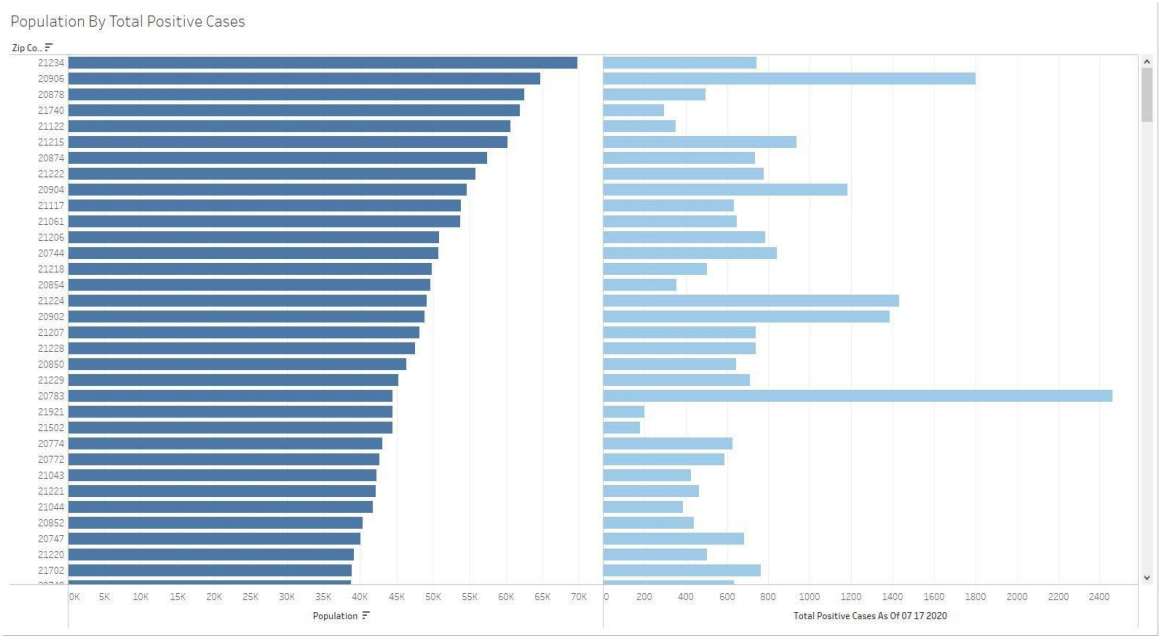

Figure 9. Population Size by Total Positive Cases

Figure 10 shows the relationship between areas with high percentages of people of color compared to total positive cases. The areas with a higher percentage of people of color have higher total positive cases compared to areas with a lower percentage.

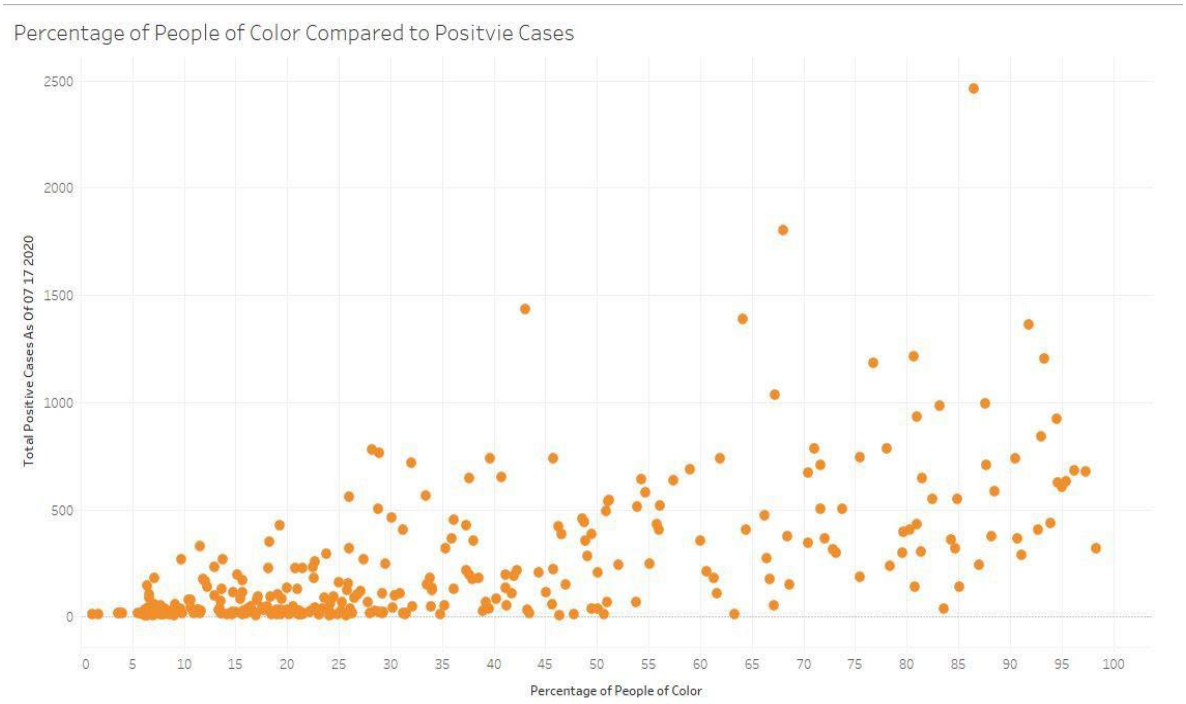

Figure 10. Percentage of People of Color by Positive Cases

CONCLUSION AND RECOMMENDATION

The data analysis results reveal, communities that have had more positive cases of Covid-19 in the State of Maryland are people that do have low access to health insurance, households that have an income that is lower than Maryland's median, large amount of people living in the area (high density of people), and communities with high percentage of people of color. In some areas such as zip codes with a higher percentage rate of 1.4 that do not have health insurance has around 2,500 confirmed cases compared to a lower percentage rate of 0.2 has a little over 500 confirmed cases.

There is a need for actions and policies that address the factors that are associated with high COVID-19 cases including median household income, percentage of people of Color, population density, and percentage of people with low insurance. Communities with high vulnerability should be provided with more personal protective equipment and resource allocation including testing, personal protective equipment (gloves and face masks), soaps, hand sanitizers, etc.

LIMITATION AND FUTURE RESEARCH

The research covers only Maryland's data, uses only the total number of positive cases, and focuses on economic data. Future work will include other COVID-19 impact indicators such as total number of deaths, the entire east coast and other USA communities, more data on social, housing, and demographic data, more data at lowest granular level – Blocks, Tracts, and hypotheses testing using a larger dataset.

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ARTIFICIAL INTELLIGENCE FUNCTION MAPPING TO CALIBRATE THEDETERMINANTS OF SMME PERFORMANCE

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ABSTRACT

Various studies have been carried out to establish the key drivers impacting small enterprise performance in developing countries. Despite many policy-oriented studies to uncover the structure of SMME performance in emerging markets, SMMEs continue to demonstrate lagging performance. Guided by a history of linear- and log-linear econometric model estimation that ignores potential network effects, our study extends the literature by implicating SMME performance as a production network. Using an enhanced Radial Basis Function Artificial Neural Network (i.e., K4-RANN), performance (factor) elasticity coefficients are derived from the estimated nonlinear regressionweights. We find urban-based SMMEs experience negative elasticity compared to their rural counterparts. Further, this study provides detailed evidence of how gender impacts SMME performance. A confirmatory analysis was conducted to establish the extent to which SMMEs are aware of the impact (magnitude) and effect (positive/negative) of the specified performance factors.Generally, we confirmed that SMME owners in KZN are not aware of the relative importance of key performance factors.

INTRODUCTION

Small, Medium, and Micro Enterprises (SMMEs) play an essential role in driving social-economic development globally (Herrington & Coduras, 2019; Herrington & Kew, 2016; Okpara & Kabongo, 2009). Various studies have enumerated the impact of small enterprises through job creation, povertyalleviation, and reducing inequality, which is fundamental for many countries. The SMME sector is a mainstay in promoting a culture of innovation and driving export growth (Chimucheka et al., 2018; Govuzela & Mafini, 2019; OECD, 2009). D'imperio (2015) study shows that SMMEs form the highest number of private enterprises globally and are highly labour absorptive. The study found small firms constitute at least 90% of all enterprises, providing more than 50% of jobs worldwide. This trend is evident in South Africa. South African SMMEs include 95% of all firms and contribute 66% to employment (Chimucheka et al., 2018; Small Enterprise Development Agency, 2019). By instigating aculture of disruptive innovation to drive competition in local and foreign markets, the SMME sector forms an efficient ecosystem with large corporates (Coad et al., 2016; Mukorera, 2014). Not surprisingly, several provinces in South Africa have economic development protocols in place to encourage SMME expansion. Second to Gauteng in the number of SMMEs in South Arica (Small Enterprise Development Agency, 2019), KwaZulu Natal (KZN) government have announced its 2030 vision to leverage SMME growth and performance as the principal avenue by which to achieve provincial competitiveness and socio-economic stability, (KwaZulu Natal PPC, 2012).

Despite their significant role in global socio-economic development, SMMEs deliver uneven and pooreconomic performance (Bureau for Economic Research, 2016; Nemaenzhe, 2010). In South Africa, SMMEs show a failure rate ranging from 50 to 95% within the first year of operation (Muriithi, 2017; Worku, 2013).

Factors that account for the poor performance of SMMEs are beginning to surface in the literature (Owalla et al., 2019). But it is well-known that entrepreneurs either lack a general awareness of the studies that present these factors or the ability to translate such factors into an operational success plan (Chiliya et al., 2015). To remedy this trend, in both developed and developing economies, contemporary economic performance studies are focusing more directly on the determinants of efficient SMME performance (Amran, 2011; Ayandibu & Houghton, 2017; Coad, 2007; Huggins et al., 2017). Largely, extant studies relied on parametric estimation methods that are not designed to estimate inter-organization networks (Lekhanya, 2016; Worku, 2013; Zhou & Gumbo, 2021a). More recent literature points to the importance of controlling for inter-organizational network effects. Forexample, Naudé et al. (2014) contribute evidence to reveal how network structure positively impacts SMME size and performance. Congruent empirical evidence provided by Wang et al. (2019) augments the importance of the positive relationship between SMME size and partner (i.e., ownership structure)in achieving diversity across the inter-organizational network.

This paper aims to deploy a network-based modelling framework to measure the relative contributionof factor inputs to explain the production scale effects of SMME performance in the manufacturing sector in KZN, South Africa. Accordingly, we implicate a production theoretic model of SMME performance by investigating how local economy capital, labour, SMME size, location, and ownershipdifferentials contribute to the complex production

of sector performance. We use a nonlinear mapping technique to model the production effects. The method used is the radial basis function (RBF)artificial neural network (ANN); or RANN. Many aspects of the RANN network topology (i.e., network structure, universal approximation capability, and structure optimization) are highly desirable properties when mapping nonlinear functions (Krzyzak et al., 1996). Given the growing importance of firm geographic location and owner's gender, four separate models to capture the moderating effectof these factors were developed. The issue of firm location has gained increasing interest post-dawn of democracy in South Africa. Especially so in KZN, the province inherited a spatially fragmented landscape marked with significant inequality and policy framework between the most urbanised areasand those still predominantly rural (COGTA, 2018). On the other hand, due to the dominance of male-owned enterprises in the province, particularly in the manufacturing sector (Ayandibu & Houghton, 2017; Ncube, 2016), special attention was also given to the entrepreneur's gender. Our study ascertained the moderating effect of location and the owner's gender on other factors impacting SMME performance in the province through this approach.

The remainder of the paper is structured as follows. In section 2, we provide a literature review. Section 3 follows with a presentation of methodology and data. Empirical results are provided in section 4. The robustness of the empirical results is addressed in section 5. Section 6 includes policy implications and a conclusion.

LITERATURE REVIEW

Small enterprises are considered critical in driving socio-economic development. A plethora of studiescharacterize SMMEs as the engine of the economy (Felipe, 1998; Jamali et al., 2014; Ngibe & Lekhanya,2019). A study by Rijkers et al. (2010) highlighted that SMMEs play an important role in strategic industries like the manufacturing sector in Sub-Saharan Africa. This has inevitably made the SMME sector the focal point of most economic growth policies in developing countries like South Africa (Bigsten & Gebreeyesus, 2007; Provincial Treasury, 2017). As such, various theoretical models have been postulated to focus on the performance of SMMEs (Astley & Van de Ven, 1983; Panda, 2015). This growing theoretical pluralism on small business performance indicates the complexity of the SMME sector (Astley & Van de Ven, 1983; Wiklund et al., 2009).

Owing to various events like the Covid 19 pandemic, SMMEs are often faced with sustainability challenges. These challenges are owing to input shortages and price shocks (Bruwer et al., 2020). TheSMME can respond to these events using a variety of resilience tactics. The literature on risk management and resilience focuses on how organizations anticipate and respond to uncertainty. Theresponse is basically "…the ability to anticipate, avoid, and adjust to shocks in their environment" (Ortiz-de-Mandojana & Bansal, 2016; Williams et al., 2017). In the context of SMME performance, resiliency results in a need to rebalance the factors of production to stem productivity reductions.

Estimating production functions rests upon an economic theory that yields testable implications. Frequently regression analyses are used to estimate production functions like the ubiquitous Cobb- Douglas function. The regression approach is utilized for its interpretability. The regression coefficients of the Cobb-Douglas production function are interpreted as elasticities, and the sum of the coefficients represents the return to scale. However, when study data does not vary linearly withthe dependent variable, solutions relying upon linear regression methods result in biased parameter estimates. Of the many alternatives to OLS, Santin (2008) established the importance of Artificial Neural Networks (ANN) as a valid semi-parametric alternative for fitting empirical production functions and measuring technical efficiency. The nonparametric feature of the ANN approach reduces modeling limitations by making the model more flexible and attractive in modelling economicphenomena where the theoretical relationship is not known *apriori* (Hanke, 1999). Essentially, the ANN approach utilizes the data to produce evidence that supports the estimated underlying production function.

SMME PERFORMANCE: A PRODUCTION THEORETIC APPROACH

The production function relates to combining various inputs to generate their products (e.g., Cobb- Douglas (1928)). Specification of these functions provides insight into the combination of inputs and their productivity, substitution between inputs, and how input relationships with outputs vary according to scale. Dormady et al. (2019) demonstrate the feasibility of mapping the production function onto resilience tactics. The tactics modeled in this research overlap the factors of productioninherent in SMME operation.

There is extensive literature devoted to building and estimating production-theoretic models based on the double log (log-log) functional form (i.e., Cobb-Douglas). The log-log transformation directly interprets the expected percentage change in the dependent variable (SMME performance) when an independent variable (factor) increases by some percentage. Guided by a need to understand the resilience of the SMME structure, the present

paper seeks to analyze the aggregate production function of SMMEs in KZN province, South Africa. To achieve this objective, we follow Zulfiqar (2012)and Dormady et al. (2019) to implement a production-theoretic mapping of the input-output functionof aggregate SMMEs. Accordingly, for this research, the generalized double-log model follows the restricted translog specification implemented by Kajiji and Dash (2012; 2013).

$$\ln y = a_O + \sum_{i=1}^{n} \beta_i \ln(x_i) + \varepsilon \quad (1)$$

where *y* is the production function of SMME output, $\beta_i \in R^n$ are parameters, and *n* are the number of *x* production factors or, in AI terms, features.

Following equation 1, the estimated model weights are reported as β_i. This specification requires stating all factor inputs as strictly positive amounts. Accordingly, non-positive observations are transformed by applying an additive offset equal to the largest negative value in the series.[1]

[1] Although this procedure is arbitrary, more details on the philosophy of transformations for econometric modeling are presented by MaCurdy and Pencavel MaCurdy, T. E., & Pencavel, J. H. (1986). Testing between Competing Models of Wage and Employment Determination in Unionized Markets. *Journal of Political Economy*, *94*(3), 33-39. ; Jacoby Jacoby, H. G. (1992). Productivity of Men and Women and the Sexual Divisionof Labor in Peasant Agriculture of the Peruvian Sierra. *Journal of Development Economics*, *37*(265-287); Soloaga Soloaga, I. (2000). *The Treatment of Non-Essential Inputs in a Cobb-Douglas Technology: An Application to Mexican Rural Household Level Data*; and Moss Moss, C. B. (2000). Estimation of the Cobb- Douglas with Zero Input Levels: Bootstrapping and Substitution. *Applied Economic Letters*, *7*(10), 677-679.

Production Returns to Scale

Production returns-to-scale (RtS) describe what happens as the scale of production increases. Adjusting the use of the factors of production is central to achieving SMME resilience. Unlike some parametric estimation techniques, the flexible nonparametric neural production function does not place *a priori* restrictions on the behavior of RtS. We expect the derived RtS estimates to reduce the information complexity on the best use of the metric to enhance firm resilience. It is well known thatRtS is equal to the sum of the output elasticities of the various inputs. We denote ϵ_i as the elasticity output with respect to performance (production) factor x_i

$$\epsilon_i = \frac{\vartheta y(x)}{\vartheta x_i} \cdot \frac{x_i}{y(x)} = \frac{\vartheta \ln y(x)}{\vartheta ln x_i} \quad (2)$$

where we let xR^ndenote the input vector corresponding to n factors of performance. Therefore, RtSfor the production function, equation 1, is stated as

$$RtS = \sum_{i=1}^{n} \epsilon_i. \quad (3)$$

The Production of Small firm Performance

Small enterprises are critical to generating the momentum required by various countries to drive economic growth due to these firms' unique attributes (Adegbite et al., 2007; Bellone et al., 2008). Thus, policymakers and owners must appreciate the production factors that drive their performance.For the former, such understanding enables the development of customized policies to prop up the sector that continues to struggle. For the latter, such awareness is vital to enhance their firms' competitive advantage through effective strategies (Egbunike & Okerekeoti, 2018; Hermelo & Vassolo, 2007; Zhou & Gumbo, 2021b). Previous studies in both developed and developing countries have sought to establish SMMEs' performance drivers to inform pragmatic policy development to strengthen these firms' performance and thus socio-economic contribution to the local economies (Hermelo & Vassolo, 2007; Muriithi, 2017; National Planning Commission, 2011). Table 1 below presents the SMME factors of performance production reported within the included literature review.For consistency with the objectives of the research, we add the hypothesized relationship to small firm performance.

Table 1: SMME Performance Factors

Determinant	Sign	Approach	Reference
Owner-Gender	+	Regression Analysis	(Amran, 2011; Essel et al., 2019)
Owners Age	-	Regression Analysis	(Amran, 2011; De Kok et al., 2010; Levesque & Minniti, 2006)
Permanent workers	+	Regression Analysis	(Pauka, 2015; Roca-Puig et al., 2012)
Temporary workers	-	Regression Analysis	(Chadwick & Flinchbaugh, 2016; Roca-Puig et al., 2012)
Total Assets	+	Logit/Discriminant Analysis/OLS	(Al-Ani, 2013; Maggina & Tsaklanganos, 2012; Voulgaris et al., 2015; Zhou & Gumbo, 2021b)
Registration type	-	Inferential	(Adegbite et al., 2007; International Finance Corporation, 2019; Zhou & Gumbo, 2021b)
Digital marketing	+	Regression & Factor analysis	(Camilleri, 2018; Jobs & Gilfoil, 2014)
Website use	+	Regression Analysis	(Camilleri, 2018; Jobs & Gilfoil, 2014; Parsons,2013)
Firm location	+	Logistic Regression/OLS	(McCann & Folta, 2011; Puga, 2002; Rijkers et al., 2010)
SMME Age	+	Regression Analysis	(Coad et al., 2018; Fritsch et al., 2010; Loderer & Waelchli, 2010)

Table 1 provides evidence on the preponderance of production function modelling of the SMME usingparametric-based techniques. However, despite interventions informed by such studies, especially inKZN province, between 2008 and 2019, SMMEs in the manufacturing sector recorded a cumulative performance decline of 14.8% (Bureau for Economic Research, 2016; Small Enterprise Development Agency, 2019). Against this backdrop, the current study extends previous studies by presenting a noveluse of a nonlinear and Artificial Intelligence (AI) approach to modelling performance drivers (factors). We support the novel approach by providing a confirmatory (e.g., robustness) analysis to assess the SMME owners' awareness of the relative importance of the estimated factors. The following section outlines the methodology that was adopted in this study.

METHODOLOGY

The radial basis function artificial neural network (RANN) is a shallow-learning nonlinear ANN. RANN with one hidden layer between the input and output layers is referenced as a shallow learning ANN. The output layer of a shallow network presents its output as a linear combination of the radial basis functions and neuron parameters.

Some processes have complex nonlinear data that challenge the traditional assumptions of the linearregression technique. The literature shows that the application of a multivariate feedforward radial basis function (RBF) artificial neural network (RANN) is an excellent method to analyze nonlinear functionals expressed with correlated variables (Leon-Delgado et al., 2018). Generally, a RANN mapping is based on partial information or learning by example. As shown in Fig. 2, the generalized RANN is a three-layer ($J_1 \rightarrow J_2 \rightarrow J_3$) feedforward neural network.

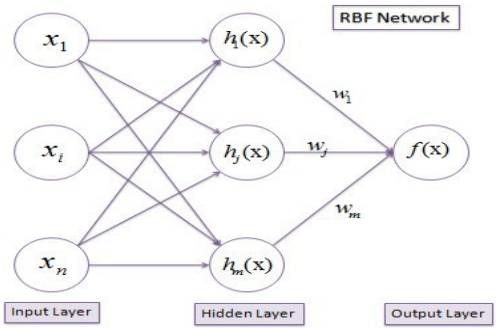

***Figure 1**: Feedforward RANN Network*
Source: Towards Data Science

Each node in the hidden layer uses a radial basis function, $\sigma(r)$, as its nonlinear activation function.Usually, the same RBF is applied on all nodes; hence, the RBF nodes have the nonlinearity $\phi_i(\vec{x}) = \phi(\vec{x} - \vec{c}), i = 1, \dots, J_2$, where $\vec{c}_i$ is the center of the i-th node and $\phi(\vec{x})$ is an RBF. The RANN uses a linear optimization method and adjustable weights to achieve a globally optimal solution (Wu et al.,2012).

In a manner that is consistent with the generalized RANN method, the optimal weighting values, w_j, are generally extracted by applying a supervised least-squares method to a subset (training set) of thedata series. The supervised learning function is stated as, $\boldsymbol{y} = f(\boldsymbol{x})$ where $\boldsymbol{y} \in \mathscr{R}^T$ is a response vector and $\boldsymbol{X} \in \mathscr{R}^{T \times n}$ is a predictor matrix. The function can be restated as:

$$y = f(\boldsymbol{x}) = \sum_{j=}^{m} w_j h_j(x) \tag{4}$$

where, m is the number of basis functions, $\boldsymbol{h}$ is the set of hidden units, $\boldsymbol{w}$ is the weight vector. Asshown by equation (5) the K4-RANN minimizes a modified SSE or cost function C:

$$C = \underset{\lambda}{argmin} \sum_{t=1}^{T} (y_t - f(x_t))^2 + \sum_{j=1}^{n} (\lambda_j w_j^2)) \quad (5)$$

where $f(x_t)$ is the model's prediction at w, and λ is the Tikhonov and Arsenin (1977) regularization parameter that controls the compromise between the degree of smoothness of the solution and its closeness to the data. N is the number of observations. Observe the *argmin* function indicates the network solution for the λ that will minimize the deviations (error). The result of applying the K4-RANNis a set of optimal weights (w_j) that minimize error (SSE) while optimizing the accuracy of the predictedfit (smoothness). The estimated weights are analogous to nonlinear least-squares regression parameters.

Generally, RANN topology has proven to be robust in modeling production models in educational learning (Kajiji & Dash Jr., 2012; 2013), smelting (Tao, et al, 2019), sustainable energy for agricultural products (Nabavi-Pelesaraei, et al, 2021), and production performance analysis in the optimization ofsystem delivery capacity (Nouri, et al, 2017). Harnessing this technique promises robust and thus reliable results and invaluable insights for both practitioners and policymakers.

DATA DESCRIPTION

The panel dataset covering all internal factors was accessed from a Durban-based SMME tax advisorycompany, McFah Consultancy. The dataset covered ten district municipalities and one metropolitan municipality (i.e., eThekwini) in KwaZulu Natal province for three years between 2015 and 2017, inclusive for a total observation of T= 573. Based on the iterative analysis of factors considered by prior research studies, the current research uses n=10 variables to account for factor inputs as featuresof the neural network approach.

PRODUCTION TARGET AND FEATURE DEFINITIONS

The efficient cultivation of SMME production is expressed as the model's target variable (SMME performance). From among the alternate and conflicting definitions of SMME performance provided in extant literature (Richard et al., 2009), we follow Roca-Puig et al. (2012) and define performance as the ratio of sales to employees.

The efficient utilization of inputs produces SMME performance. These inputs are data features that are mapped onto the target variable of the study. For this study, the mapping features (i.e., determinants) of SMME performance include annual sales, SMME owner's gender (male v/s female),SMME location (urban versus rural), SMME owner's age, SMME age, number of temporary workers, number of permanent workers, total assets, website use, registration type, and digital marketing platforms usage. Except for the categorical variables (i.e., location, Gender, digital marketing, and website use), all data for each feature was log-transformed. SMMEs were grouped into two main geographical areas, urban and rural. The former is for SMMEs based in eThekwini, the province's onlymetropolitan municipality, and the latter for those found across the ten predominantly rural district municipalities. Website use indicated whether an SMME had a functional website or not, with 1 indicating the former and 0 the latter. Registration type reflected whether an SMME was a proprietaryliability (Pty) registered as per the Companies Act or not, with 1 indicating that the enterprise is Pty registered and 0 otherwise. Digital marketing captured the company's use of digital marketing-platforms, 1 confirming that and 0 otherwise. SMME's gender indicated whether the SMME owner was male or female.

SMME K4-RANN Models

Based on equation 4, we specify four modeling equations as shown below. The reference model was selected based on AIC and MSE.

1. *Rural(M):* $LN(y) = w_1(urban) + w_2(female) + w_3 LN\ (Owner\_Age) + w_4\ LN(Perm\_workers) + w_5\ LN(Temp\_workers) + w_6 LN(total\ assets) + w_7(Website) + w_8\ LN(SMME\_Age) + w_9(Reg\_type) + w_{10}(Digt\_kt)$
2. *Rural(F):* $LN(y) = w_1(urban) + w_2(male) + \ldots + w_{10}(Digt\_Mkt)$
3. *Urban(F):* $LN(y) = w_1(rural) + w_2(female) + \ldots + w_{10}(Digt\_Mkt)$
4. *Urban(M):* $LN(y) = w_1(rural) + w_2(male) + \ldots + w_{10}(Digt\_Mkt)$

The four above equations were used to supervise the mapping of SMME performance factors. Four alternate

models were examined: Rural(M), modelled performance drivers for rural-based and male-owned enterprises, Rural(F) for rural-based and female-owned enterprises, Urban(F) for urban-basedand female-owned enterprises, and finally Urban(M) for urban-based and male-owned enterprises.
.
As with all supervisory neural network applications, the data was scaled before solving the neural network simulations. ANN methods generally produce small weights in the model. Likewise, the errormeasures between predictions and expected values are also relatively small. This fact requires scalingall data. Data scaling changes the data (x) into another form (y) such as in $y = f(x)$. This study transformed data by the de-correlating zero-phase component analysis (ZCA), aka ZCA Whitening (Chiu, 2019). After scaling, the total observations were split into two sets – training and validation. The training set had 189 data points (i.e., 33% of the total observations), and the validation set comprised the remaining 384 observations.

The basis function radius (shape parameter) was set to 1.0, and the multiquadric activation function was implemented for all neurons. The generalized cross-validation (GCV) error minimization rule was invoked. GCV adjusts the average mean squared error over the training set. GCV is a machine-learningtechnique that is closely related to OLS regression error measurements.

EMPIRICAL RESULTS

The main findings from the neural network simulations are discussed in this section. The estimated SMME K4-RANN Network is presented in Fig 2 below. Detailed results are presented in Table 2. The input layer shows the features used in the network mapping process, while the output layer shows predicted firm performance. The signed effect on the target (i.e., performance) by the feature variables is indicated by red (negative) and green (positive).

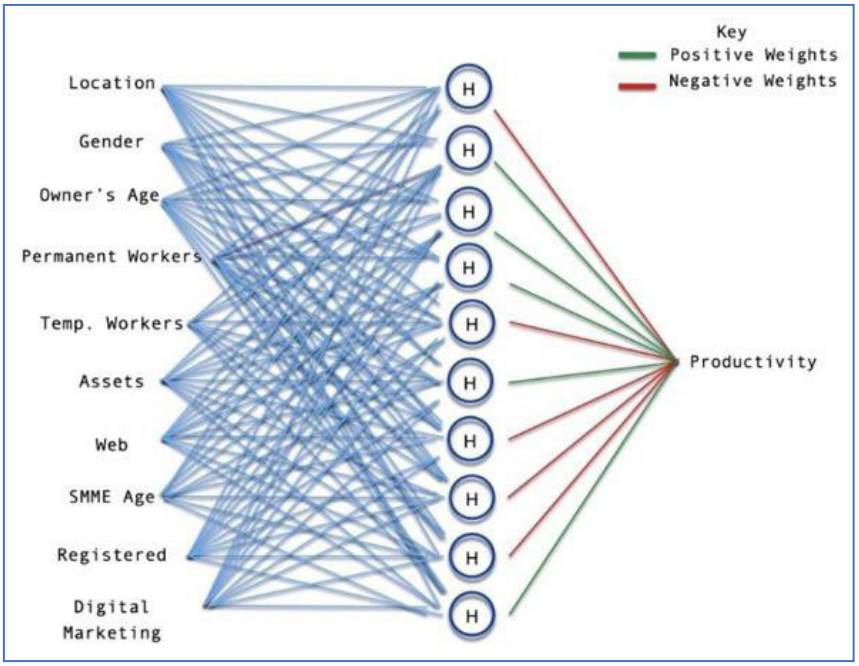

Figure 2: *The Urban-Female SMME K4-RANN Network Feature Chart*

Based on the network feature chart in Fig 2, we can observe that location, temporary workers, websiteuse, SMME age, and proprietary limited registration negatively impact firm performance. On the otherhand, the entrepreneur's gender, owner's age, permanent workers, total assets, and digital marketing positively affect KZN-based manufacturing SMMEs' performance. The network chart only provides anaggregated view on firm performance for model 3 – Urban(F). As such the Table 2 below provides an in-depth breakdown of the four models.

K4-RANN: Panel Data Factor Elasticity Weights

Utilizing the three-year panel data for the KZN-based SMMEs, the table below shows the factor elasticity weights for the four estimated models.

Table 1: Panel data results

	Model 1 Rural(M)	Model 2 Rural(F)	Model 3 Urbarn(F)	Model 4 Urban(M)
Urban			-0.0564	-0.0784
Rural	0.0207	0.0094		
Female		0.0270	0.0112	
Male	0.0226			0.0236
Owner_age	-0.0113	-0.0035	0.0055	-0.0013
Perm_workers	-0.0029	0.0018	0.0161	-0.0019
Temp_workers	0.0339	0.0303	-0.0126	-0.0185
Assets	0.0961	0.0816	0.0992	0.1557
Website	-0.0130	-0.0710	-0.0001	0.0190
SMME_Age	-0.0532	-0.0265	-0.0330	-0.0621
Reg_type	-0.0925	-0.0487	-0.0292	-0.0349
Dig_mkt	0.0011	0.0003	0.0010	0.0021
∑ elasticities (RtS)	0.0015	0.0005	0.0016	0.0032
AIC	-1695.06	-1649.36	-1601.58	-1554.46
Fitness (MSE)	0.05013	0.05429	0.05901	0.06407

K4-RANN: MODELS AND RESULTS DISCUSSION

Based on the analysis presented in Table 2, model 1, Urban: Male, has the lowest AIC and MSE metrics. Accordingly, this model serves as the reference model throughout the analysis. Based on the referencemodel, ceteris paribus, a change to a rural location changes SMME performance by 0.021 percent. Similarly, male ownership also positively impacts SMME productivity by 0.023 percent. Contrary to the extant literature, the model shows that owners' age and utilization of permanent workersadversely affect enterprise performance. The elasticity results indicate that for a 10 percent increase in owner's age, SMME performance decreases by 0.113 percent. Against expectations, for every ten percent increase in permanent workers, performance deteriorates by 0.029 percent. By contrast, a ten percent increase in temporary workers results in a 0.339 percent increase in SMME performance.As expected, a 10 percent increase in SMME total assets improves productivity by 0.96 percent. The use of digital platforms does not materially benefit SMME performance. Operating a website negatively impacts their performance by 0.130 percent. The regulatory burden associated with the Pty effect on SMME standing creates a 0.0925 percent drag on performance. Finally, we note that forevery 10 percent increase in the age of an SMME, performance falls by 0.53 percent. Overall, SMME firms in the KZN province experience very small increasing returns-to-scale (0.0015); a result that is sosmall at the sector level that we deem this to be consistent with the neutral to declining sector performance reported above.

The detailed analysis presented for the reference model allows for comparative insights across the remaining three estimated performance models. Upon review, the model solutions report a distinction for an urban location–there is a negative impact on SMMEs performance. Moreover, the negative impact of urban location on SMME performance is more pronounced for male than female- owned firms. This finding aligns with previous studies in developed countries (Huggins et al., 2017; Stam et al., 2008) but is contrary to studies in developing countries, particularly Africa, where it was previously thought that urban location positively impacts performance (Bigsten & Gebreeyesus, 2007;Shiferaw, 2009). Our novel findings also determined that there are no Gender differences in SMME performance based on location. The result differs from previous related studies in which either female-ownership (Hiatt & Sine, 2014; Shiferaw, 2009) or male-ownership (Amran, 2011; Essel et al., 2019) positively affected enterprise performance.

As was established in the reference model, except for urban female owned SMMEs, the owner's age negatively impacts performance. This finding was mainly contrary to the extant literature, as entrepreneurs are expected to leverage their experience to drive performance (Small Enterprise Development Agency, 2019; Zhou & Gumbo, 2021b). In the context of the labor input, permanent workers have positive and negative elasticities for female and male-owned SMMEs despite their location. The finding shows that a permanent workforce enhances female-owned SMMEs' performance while prejudicially affecting male-owned enterprises. Key to note is that the effect of permanent workers on urban-based female-owned SMMEs performance is nine times better than thatof their rural

counterparts, while the difference is marginal for male-owned enterprises. A positive effect of permanent workers was expected. However, the negative effect is contrary to previous studies (Pauka, 2015; Zhou & Gumbo, 2021a).

On the other hand, temporary workers' performance varies by location, with rural enterprises benefiting from this type of workforce compared to their urban counterparts despite the owner's gender. The analysis showed that a percentage increase in temporary workers for rural-based businesses improves performance by 0.030 percent while negatively impacting urban firms by at least0.0126 percent. The finding is partially contrary to a study by Zhou and Gumbo (2021b), which established a positive effect of temporary workers on performance for urban and rural-based SMMEs.However, it is worth noting though that, as stated earlier, our paper differs from the literature in boththe modelling technique and the adopted approach.

As was established in model 1, the SMME assets feature elasticity estimates were optimistic for all enterprises regardless of location. The effect was more pronounced for urban-based male-owned SMMEs whose performance improved by 0.1557 percent for a one percent increase in assets. The finding corroborates previous studies, which also established the central role of the firm asset base indriving performance (Maggina & Tsaklanganos, 2012; Voulgaris et al., 2015). Except for urban-based male-owned SMMEs, website use negatively affected performance, which was more pronounced forfemale-owned rural-based enterprises. The results highlight that SMMEs in the province do not leverage their websites to enhance performance. Contrary to our findings, previous studies established the positive role of websites in driving firm performance (Buyinza, 2011). The SMME's agehad a negative impact on performance. A finding which was significant for male-owned enterprises in general, particularly those in urban areas. Previous studies show that SMMEs in the province suffer from the real senescence problem (Coad et al., 2018; Loderer & Waelchli, 2010; Zhou & Gumbo, 2021a). As expected from consulted literature (Adegbite et al., 2007; Muriithi, 2017), Pty registration type negatively affects SMME performance despite their location or owner's Gender. This result indicates that this type of registration of SMMEs disadvantages formally registered SMMEs comparedto those not registered.

As expected from extant literature (Camilleri, 2018), digital marketing platforms had a positive, albeitlow, effect on firm performance. The result shows that while the positive impact was expected, the feature weights are very low across all models, implying minimal impact on the performance of SMMEs. Finally, the study established that urban-based female-owned SMMEs' returns to scale are three times better than those of rural female-owned firms. Urban male-owned SMMEs' returns to scale are two times that of their rural counterparts. The analysis connotes that urban-based SMMEs perform better than those in rural areas regardless of the owner's gender. Overall, the analysis acrossall four models showed that KZN SMMEs experience diminishing returns to scale, implying that SMMEperformance goes up proportionately less than the increase in the input features. This finding explains the continued failure of SMMEs in the country despite various interventions by the government at national, provincial, and local levels (Herrington & Kew, 2016; Muriithi, 2017; Worku, 2013). Our results, in line with the Small Business Institute (Dludlu, 2021), show that despite numerous interventions by the South African government, the contribution of SMMEs remains largely subdued as policies are not sector and context specific. The lack of specificity highlights the need for the government to devise customized interventions to assist SMMEs in navigating the current volatile operational environment. Our approach utilizing K4-RNN provides a basis to inform the developmentof effective policies.

ROBUSTNESS: CONFIRMATORY SURVEY ANALYSIS

A follow-up survey was conducted in 2018 as part of the confirmatory analysis. Of the 191 SMMEs, 121 responded to the survey resulting in a participation rate of 63.3 percent. The follow-up survey aimed to establish the extent to which SMMEs are aware of the impact (magnitude) and effect (positive/negative) of the specified performance determinants. The survey dataset covered the sametypes of variables that were analyzed under the panel data section. The SMME owners indicated whether the variables had a negative, none or positive effect on performance for each variable. For the sake of brevity, this section mainly focused on variables whose rating by SMME owners was significantly contrary to the findings from section 4, in which K4-RANN was employed to ascertain their effect on performance. The panel data analysis showed that SMME owners expected total assetsand digital marketing to impact performance positively. SMME owners highlighted that Pty registration type was as initially established, negatively impacted their performance.

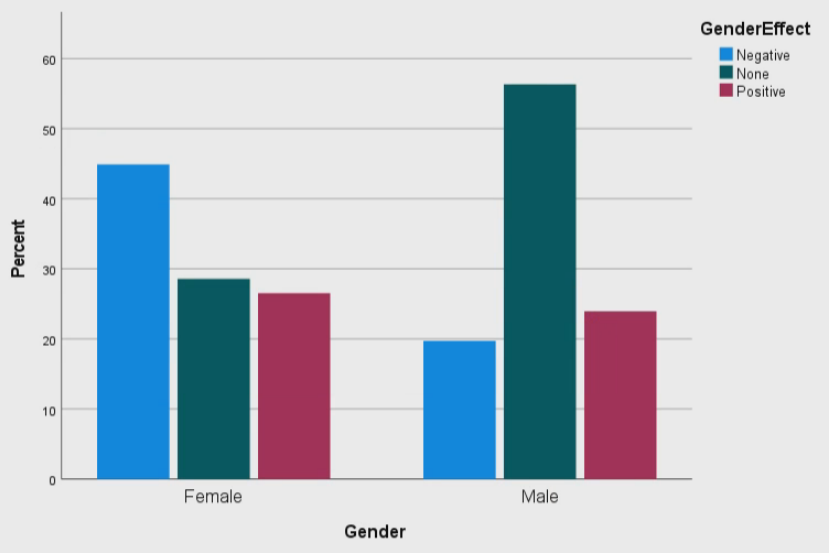

Figure 3: Gender Effect on Performance

Fig 3 shows that male entrepreneurs generally think that their gender does not affect performance, which is in line with panel data results. On the other hand, contrary to the findings using the longitudinal dataset, female SMME owners assume that their gender negatively impacts their performance. Key players (i.e., provincial government, incubators and other enterprise development institutions) in the SMME sector bear a responsibility to educate women entrepreneurs of their potential to create and maintain a sustainable enterprise.

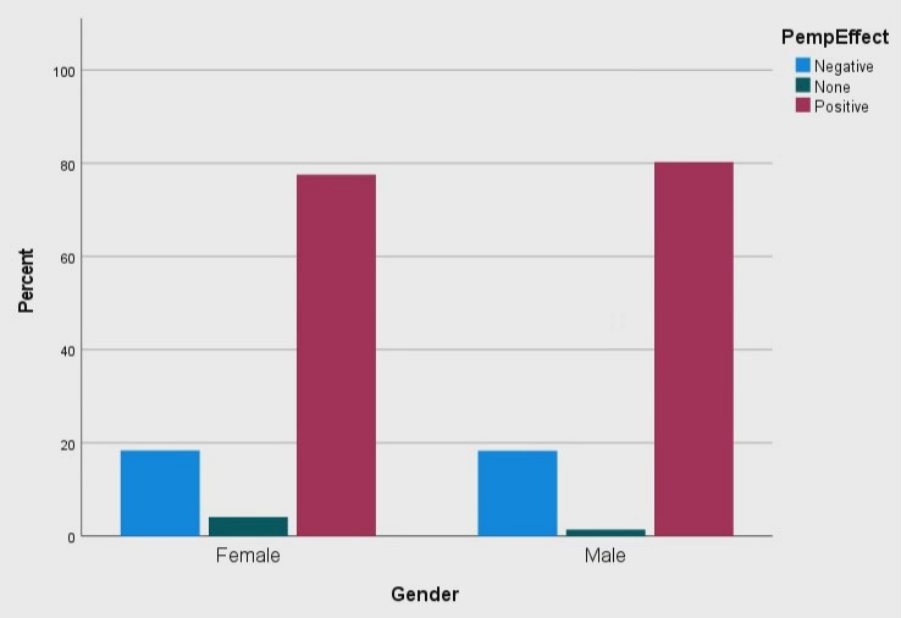

***Figure 4**: Gender view on Permanent Workers Effect on Performance*

From Fig 4, both male and female entrepreneurs expect a positive impact on their firm's performance from permanent workers. What is not apparent in this chart is the confounding effect location plays in the Gender view of permanent workers. As is evident from the panel data analysis, the effect fromthe permanent workers is mixed within gender and within the location. It is consistent between maleand female groups that permanent workers impact performance positively or negatively (i.e., the non-ecategory is minimal).

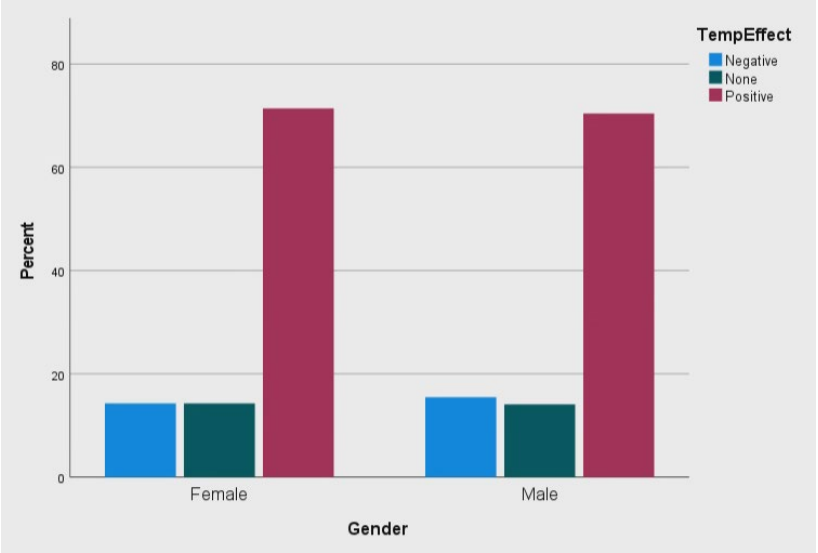

***Figure 5**: Gender view of Temporary Workers Effect on Performance*

Like the permanent workers' category, both male and female entrepreneurs expect a positive impacton their firm's performance from temporary workers. However, unlike the permanent workers' category, approximately 18 percent of both male and female respondents feel that there is no impacton performance from the temporary workers. Once again, the confounding effect of location is not visible in fig 5.

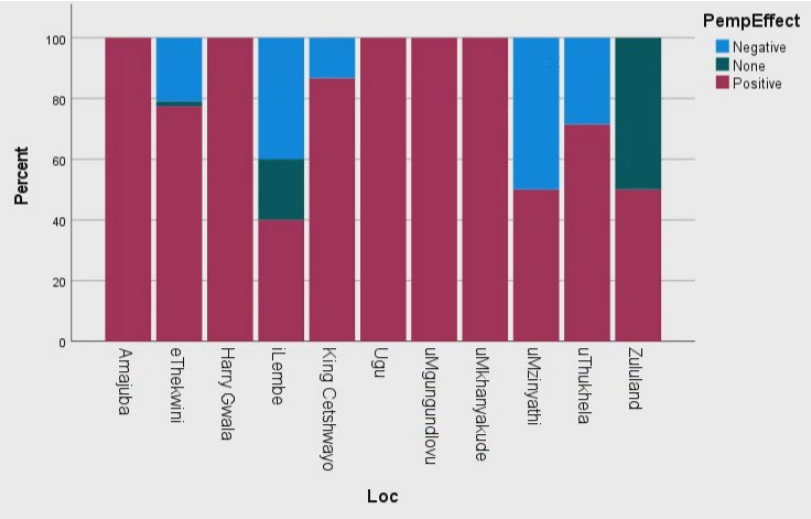

Figure 6: *Location wise view of Permanent Workers Effect on Performance*

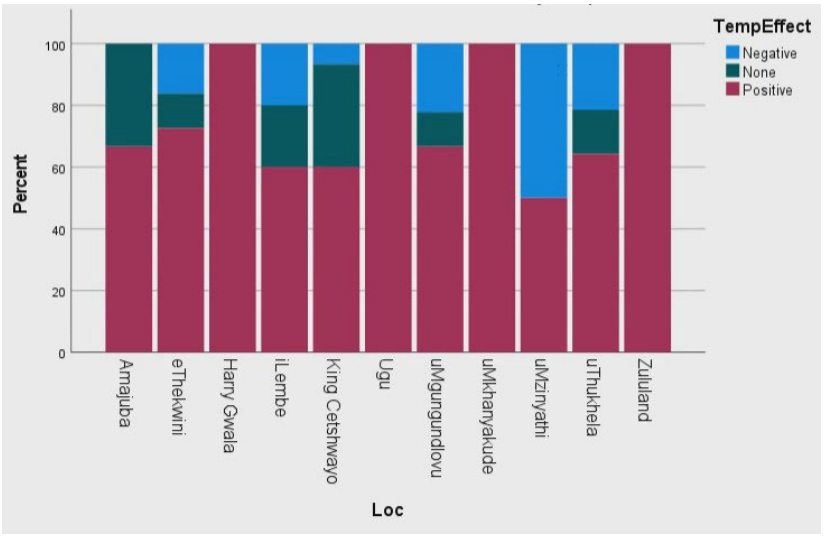

Figure 7: *Location wise view of Temporary Workers Effect on Performance*

Fig 6 and 7 show that contrary to panel data analysis, urban (eThekwini) based enterprises essentiallythought that both permanent and temporary workers positively impacted their performance. The difference is in the *none* category. The metropolitan area respondents are more emphatic with their assessment of the permanent workers than temporary workers. Other rural regions such as Amajubaand Zululand are reversed in their opinions on the temporary and permanent workers. The former is emphatic about the positive effect of permanent workers whereas the latter is more emphatic aboutthe temporary workers.

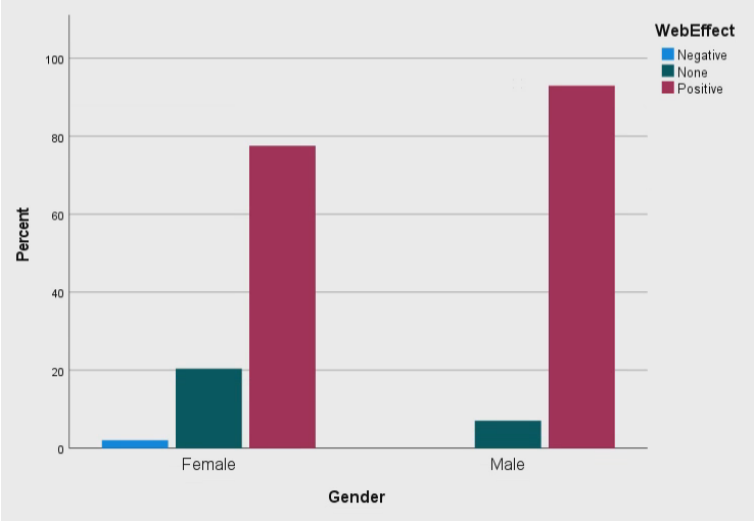

Figure 8: *Gender view on Website Effect on Performance*

As per Fig 8, the graphical analysis indicates that most of the SMMEs thought that running a functionalwebsite positively impacted their performance, contrary to the findings of the panel data analysis. This result shows the mismatch between SMME owners' views versus the actual impact of the company's website. Interestingly, almost 22 percent of the female respondents did corroborate the findings of the panel data.

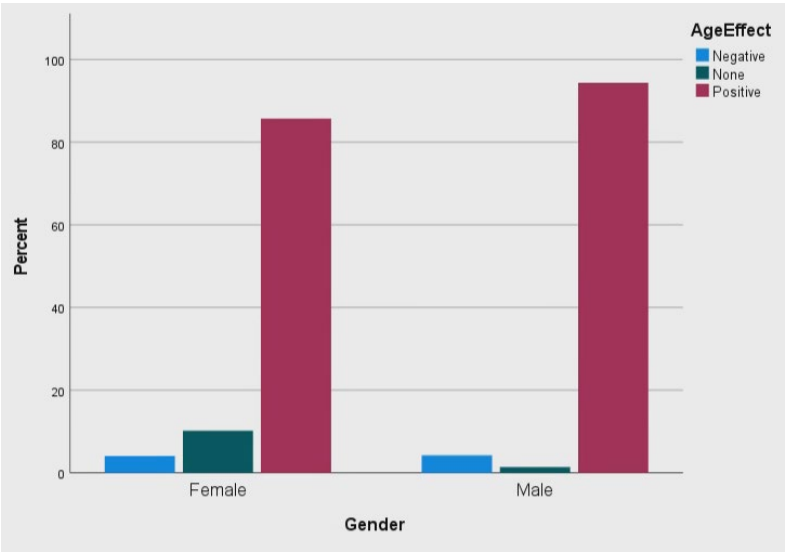

Figure 9: *Gender view of SMME Age Effect on Performance*

Contrary to the findings obtained from the panel data analysis, Fig 9 indicates both male and female entrepreneurs thought firm age positively affected performance. In the panel data analysis, this feature negatively impacted performance across all models. The discovery is quite disturbing as old SMMEs are not aware of the negative effect of their firm's age on performance contrary to their expectations. The same finding was also established for SMME age as well. The fact that SMME ownersthink that their and company's age positively impact performance contrary to their data presents a concerning situation as the Small Enterprise Development Agency (2021) highlighted that there was an increase in old-aged firms (above 20) and a decrease in those below 20 years in operation. The report also noted a decline in youth owned SMMEs and an increase in those owned by old entrepreneurs. This finding seems to illuminate further the possible reasons behind these enterprises'continued failure across the country.

CONCLUSION AND POLICY IMPLICATIONS

The foundation of this study was a three-year panel dataset. Using a nonparametric mapping technique, we measured factor elasticity inputs to extrapolate the scale of performance for SMMEs inthe KZN province. This study's neural network mapping approach was motivated by the failure to produce meaningful performance advances based on objectively determined factors from parametricresearch efforts. By widespread accord, it is well understood that SMMEs across South Africa have underperformed even when adopting traditionally identified determinants of performance.

After mapping the network performance elasticities, we then utilized survey data from the same cohort of SMMEs to robustly assess feature awareness and incorporation in ongoing operations. Unlike previous studies, a robustness examination enabled our research to establish the current understanding of the SMME owners' assumptions regarding factors impacting their operations compared to the actual data-driven insights. Such an approach ensured that our results were robust. Thus, the government can implement effective recommendations that can improve the sustainability of SMMEs in the province and country at large.

The analysis provided novel insights regarding the endogenous features underlying the production of SMME performance in the KZN province. Firstly, it was clear that their location adversely impacted their performance for firms based in urban areas (eThekwini Metro). This finding requires thegovernment to depart from its one size fits all approach to providing support to SMMEs, a customizedapproach that considers locational issues is needed. The negative effect of entrepreneurs' age on performance should be disturbing to the government. The government response to meet the challenge should include industry-specific training programs targeting firms owned by old entrepreneurs. Training programs are a viable mechanism to assist this group in driving the sustainableperformance of their enterprises. Secondly, the moderating effect of owner's gender on the effect ofpermanent workers on SMME performance further attests to the sector's heterogeneity. The government should actively consider the development of capacity-building programs which assist male owners in improving while further helping female owners to leverage their skills in managing permanent workers, respectively. Thirdly, as inputs to the firm’s production function, temporary workers require a different approach than permanent workers. The impact of the temporary workeris moderated by location. Policymakers need to develop programs that assist urban-based SMMEs in utilizing the region’s temporary workforce to impact performance positively. Fourthly, the negative and minimal effect of website usage and digital marketing platforms requires targeted digital skills support programs for owners to ensure that SMMEs benefit from using such media. Also, to minimize the negative impact on performance attributable to inefficient deployment of (low-cost) digitalanalytics and related tools, government support should encourage SMMEs to monitor their digital platforms and proactively engage with clients. Lastly, to address the negative effect of firm age on performance, it seems evident that government oversight will need to shift. The shift must de- emphasize the current governance model based on incubation support for young firms. The new model must be one predicated on practical support for older firms suffering from the liability of capitalobsolescence. Interventions to drive innovation and agility among older SMMEs are required to stemthe current inverse trend between sales and firm age.

Finally, as Pty registration type continues to impact SMME performance negatively, this study adds tothe calls for a re-evaluation of regulatory requirements and government oversight over the SMME sector. Benchmarking South Africa’s regulatory compliance regime with those of its peers like Malaysia and OECD countries boasting the best performing SMME sectors would help guide country-wide efforts to ease the stringent requirements of formal registration. In conclusion, we note how theconfirmatory analysis pointed out that SMME owners have a misplaced view of what constitutes a set of efficient features to assure future performance gains. This finding has profound implications for stakeholders in the sector who devise interventions primarily based on surveys rather than empirically driven production-theoretic performance. A non-empirical approach to the issue will undoubtedly result in a stream of continuing recommendations that, unfortunately, will promote diminishing returns to scale with ongoing firm failures. We close the study with a suggestion. The South African government is well-advised to collaborate with ecosystem players to develop a comprehensive data analytics system to promote ongoing research that will inform the public and policymakers alike on how best to achieve new and more effective sector interventions.

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Dr. Helper Zhou, is a Professor at Durban University of Technology, South Africa.
Dr. Gordon Dash, and Dr. Nina Kajiji are Professors at the University of Rhode Island.

44th Annual Meeting

October 21 - 22, 2021

Days Inn
240 South Pugh St.
State College, PA 16801 (814) 238 - 8454

Official Conference Program

National Association of Business, Economics and Technology

Session 1: Sylvan Room 9:35 am – 10:35 am

ECONOMICS/TAX

Session Chair: *Linda Hall, State University of New York at Fredonia*

A Taxing Dilemma: Taxing the Illegal Cannabis/ Marijuana Industry

John D. Grigsby Thomas Jefferson University

The state-legal cannabis/marijuana industry has been growing at a very rapid pace. There are only 14 states that still ban cannabis use and this number is expected to decrease significantly in the very near future. Even though states are legalizing marijuana and treating its sale as a legal business enterprise, it's still illegal and considered a Schedule 1 controlled substance under federal law. Under federal tax law, income is taxable, even if the business is considered illegal. This has forced cannabis/marijuana businesses to operate on a largely cash-only basis which means that they are precluded from taking key tax deductions and credits and can only deduct their cost of goods sold. Normal overhead expenses, such as advertising expenses, wages and salaries, and travel expenses are not deductible. This paper discusses the current taxation of the cannabis/marijuana industry, areas where guidance is needed from the Internal Revenue Service, and some proposals for the future tax treatment of the cannabis/marijuana industry.

Income Inequality in Pennsylvania 19882018: Estimates from Taxable Income Bracket Data

David Latzko Penn State University

The Pennsylvania Department of Revenue produces an annual report summarizing information on taxable income as reported on state income tax returns. The publication reports the amounts of taxable income by types of income by county and also by total taxable income ranges, along with the number of observations between the lower- and upper-income limits and total income in each bracket. I use this grouped data to estimate the distribution of income among Pennsylvania residents with a focus on how the degree of income inequality has evolved over the past thirty years and which particular sources of taxable income have contributed towards the increase in income inequality. I measure the inequality in the distribution of income using the Gini coefficient computed geometrically from a graph of the Lorenz curve estimated from the grouped tax bracket data. I calculate the area under the Lorenz curve by adding up the areas of the trapezoids formed by the adjacent bracket end points and the horizontal axis. The estimated Gini coefficient for total taxable income rose from 0.292 in 1988 to 0.314 in 2018, a 7.5 percent increase in the degree of income inequality with much of the increase coming after 2002. The main drivers of the increase in income inequality in Pennsylvania over the past 30 years have been an increasing inequality in both compensation and interest income.

Session 2: Willow Room 9:35 am – 10:35 am

SPORTS MANAGEMENT

Session Chair: *Kerry D Fischer, State University of New York at Fredonia*

Little Known Aspects of the Financing of Large Sport Facilities

Norman C Sigmond Kutztown University of Pennsylvania

In large cities that are home to professional teams, it has become common that large sport stadia and megaplexes have been constructed. Some, as in Chicago, have retained parts of the old historical facility that had existed for many decades, and incorporated the old structure as part of the new stadium. It is often perceived that the sport team pays for these stadia. Some might believe that banks or other commercial enterprises whose names appear on the structure have paid for all or part of the building. In many cases, those entities could have paid either small or large amounts. However, in the current environment where a large stadium complex could have a construction price tag of one billion dollars or more, many observers would find it challenging to discover that a sizable amount of the cost has been born by the citizens of the city. The city will normally form a kind of "partnership" with the team and the corporate community to cover the costs. However, the citizens of the city will typically pay an uncommonly high price. This will occur despite the dubious promise of a positive economic impact to the city. This paper will examine the various ethical, legal and financial issues of these arrangements.

Give the Fans What They Want: A Market Segmentation Approach to Sport Fans' Social Media Usage

Kerry D Fischer State University of New York at Fredonia

The purpose of this study was to segment fans of professional sport based on the type of social media platform they preferred to use as well as their social media usage motivations. Convenience and snowball sampling techniques were used to collect data from fans of professional sport who specifically used social media to consume sport. The online survey instrument consisted of items from the previously validated Motivation Scale for Sport Online Consumption (MSSOC; Seo & Green, 2008) scale, and items indicating how often respondents used Facebook, Twitter, Instagram, and Snapchat. Hierarchical cluster analysis revealed three distinct social media preference groups labeled a) Facebook Devotees, b) Infrequent Users, and c) Social Media Aficionados. Facebook Devotees generally preferred to use Facebook more than any other social media platform, while the Social Media Aficionados had the highest mean usage rates for Twitter, Instagram, and Snapchat. Two groups emerged for social media usage motivation: a) Multifaceted Fans and b) Casual Supporter. Multifaceted fans exhibited high levels of motivation for nearly all usage motivations, while Casual Supporters had high motivation mean scores for only two motivations, "passing the time," and "information." Overall, the findings from this study provide sport organizations with valuable marketing and communication information. The segments uncovered in the results reveal that fans have different motivations for consuming sport via social media. Sport organizations can use this information to tailor

their social media strategy to specific fan segments, increasing engagement, strengthening fans' brand loyalty, and ultimately generating more revenue.

Student Athletes Drive Engagement for Businesses in NIL Partnerships

David Gargone — Misericordia University
Marissa Molnar — Misericordia University
Traci Kieffer — Misericordia University
Ryan Mcgoff — Misericordia University

Collegiate athletic departments, student-athletes, and businesses are all trying to navigate recently changing NCAA legislation governing name, image, and likeness (NIL) rights. This changing landscape is allowing student-athlete endorsers to play an important role from the perspective of brand building for local, regional, and national companies. This study examines the initial explosion in NIL deals for student-athletes and the relationship between student-athlete endorsers and sponsoring companies. An analysis of the social media activities of both parties was conducted and the initial findings suggest businesses are benefiting from the NIL relationship with the student-athlete.

Session 3: Linden Room 9:35 am – 10:35 am

PEDAGOGY

Session Chair: *Robert S. Fleming, Rowan University*

Developing Crisis Management Skills in Business School Graduates

Robert S. Fleming — Rowan University

This session will discuss the importance of developing crisis management skills in business school graduates. After examining the challenges that contemporary business and their leaders face with respect to the ever-present threat of crisis events and situations, strategies for preparing future business leaders with the knowledge, skills, and confidence to enact their respective roles and responsibilities successfully in times of crisis will be discussed. The approach that our business school has adopted in preparing our graduates in this mission critical area will be presented.

Session 4: Holmes / Foster 9:35 am – 10:35 am

Session Chair: *Audrey Guskey, Duquesne University*

3 Core Component of Agile Selling

Shahriar Gias — Slippery Rock University of Pennsylvania

The two main types of sales are agile and adaptive selling. While adaptive selling is about surviving changes, agile selling is about responding quickly to changes in demand. Agile selling is a term that broadly defines adaptive planning, evolutionary development, early delivery, and continuous improvements (Weirich, 2019). If one were to break down agile selling, it could be broken down into three main components. The first component is to align the customer with the solution. It is vital in sales that a salesperson understands if their solution aligns with the customer's version of the solution. The second component of agile selling is to iterate frequently and collaboratively. These iterations are proactive when it comes to change. Without a

warm embrace to the concept of change, the salesperson will be left without a sale. This also means that planning should be done many quarters in advance. Finally, agile selling cannot succeed without proper processing tools. These tools should be used to help monitor efficiency and find ways to promote efficiency as well. If a tool can be used to find a way to alleviate a salesperson's daily task, freeing them to spend more time with a customer, the more the bond between salespeople and customer will grow.

Gen Z Green Fashion Segments: Implications for Marketing

Kurt Schimmel — Slippery Rock University of Pennsylvania
Jeananne Nicholls — Slippery Rock University of Pennsylvania
Rhonda Clark — Slippery Rock University of Pennsylvania
Kirsten Hegberg — Slippery Rock University of Pennsylvania

This research examines attitudinal differences between a priori segments based on college students' "sustainable wardrobe" as a percentage of total wardrobe. The sample is relevant to companies interested in targeting this market for at least two reasons. One is college students are consumers and make choices on how to spend their discretionary income and they are supporters of green fashion (Dickenbrok, & Martinez, L. 2018; Gazzola, Pavione, Pezzetti, & Grechi, 2020 and Muralidhar, 2019). The second reason is that the generation of students recently graduated or still in college (Gen Z) are currently consumers and are developing their buying habits (Su, Watchravesringkan, Zhou, & Gil, 2019) and are environmentally concerned (Rauch and Kopplin, 2021). The study examines three a priori segments of self-reported descriptions of students' current wardrobe. The segments include three "personas." The "Wee Greens" are low green fashion purchasers with 0-24% of wardrobe described as green fashion. Next, the "Lite Greens," describe their wardrobe having 25-49% green fashion. Those more loyal to green fashion, the "Me Greens," describe wardrobes having 50% (+) of green clothing. The attitudinal variables include Perceived Environmental Knowledge; Environmental Concern; Attitudes Toward Sustainable Clothing; Subjective Norms; Purchase Intention; and Purchase Behavior. A discriminant analysis revealed statistically significant differences between the "Me Greens" and "Wee Greens" across all constructs and several differences between "Lite Greens" and "Me Greens." The findings of this research have both retail and marketing message implications directed at this important college-aged consumer group.

You Watching Me? Observations of Observation Research

Audrey Guskey — Duquesne University

Over a course of a 30-year period, students in Consumer Behavior classes were required to complete a group project using the observation research methodology. The assignment was to watch consumers in a retail or customer service setting and record their observations. Students were to follow a scientific method of determining a hypothesis and testing this hypothesis. Students were given specific criteria for this project such as the number of hours required in the observation, number and complexity of variables to measure, and the data collection instrument. Students were permitted to be a participant observer in their research. Examples of this were: whether a sales associate would provide better customer service depending upon how the customer is dressed; portraying different roles (student, business person, family person) when shopping for a car; watching people in a zoom meeting; shopping for engagement rings. Over 200 projects were analyzed using content analysis. The results showed interesting consumer behaviors that other forms of research would not discover. This paper highlights some of the noteworthy findings of these studies and well as what the students learned regarding conducting observation research.

Session 5: Logan / Harris 9:35 am – 10:35 am

DISRUPTIONS

Session Chair: *Noel M. Criscione-Naylor, Stockton College*

Supply Chain Disruptions During the Pandemic (COVID-19) in the United States

Sut Sakchutchawarn — State University of New York at Plattsburgh
Nidhi Borad — State University of New York at Plattsburgh
Tanay Gehi — State University of New York at Plattsburgh

The COVID-19 pandemic has impacted on world economy significantly. It presents an unprecedented challenge to public health, supply chain system, and food system worldwide. In the United States, many manufacturers, companies, hospitals, retailers, and wholesalers were not prepared for what was yet to come. Most of companies have struggled to maintain a steady flow of goods, medical supplies, and services. The US supply chain has been facing multiple obstacles. Firms were not prepared to face a situation like this as it was unprecedented. They do not have proper strategies to deal with. Many organizations are still experiencing difficulties to construct a sustainable supply chain system. Global sourcing has affected the U.S. logistics and supply chains immensely. The current model and process have not been able to capture these disruptions properly. In this paper, the disruptions of the pandemic to organizations in the United States will be discussed. The demand and supply mismatch and the need for a dynamic supply chain will be discussed as well. Solutions and strategic options that are being contemplated will be presented. Suggestions as to how it can be prepared to prevent it from happening again in the future. Keywords: Covid-19, Supply chain disruption, Strategic options

Motivation to Work: What Matters Post Covid-19

Noel M Criscione-Naylor — Stockton College

As the world moves forward from the COVID-19 pandemic, organizations have begun to experience yet another challenge, how to motivate employees to return to work and stay working. As part of COVID-19 responses by the government and businesses to adhere to safety protocols, many employees found themselves furloughed, laid-off, working remotely or in a hybrid work model at home with limited time in the workplace. With the COVID-19 vaccine guaranteed as 88% effective, many original protocols have been reduced and organizations have begun to open to full capacity. However, employee shortages have made this a significant challenge leaving employers questioning how to motivate employees
to return to work and stay engaged while working. This shortage in the workforce has be attributed to higher-than-normal compensation by unemployment and workers placing more emphasis on family-life balance. Qualitative data was collected from working hospitality professionals seeking insight into what motivates them to work and stay at work. Data was collected using a short, five question survey. Survey questions included questions to elicit specific conditions that contribute to their motivation to work. Furthermore, the last survey question sought to identify strategies employers may currently use and offer suggestions for improvement. Specifically, this research paper and presentation uses Maslow's Needs Hierarchy as a framework to understand and analyze collected data on how employees have repositioned their needs in the post COVID-19 environment.

The Impact of COVID19 Pandemic on Women-Owned Businesses A Case Study

Diane D. Galbraith Slippery Rock University of Pennsylvania

The COVID – 19 global pandemic took the world by surprise as it touched people personally and professionally and upended the daily lives of people everywhere. This paradigm shift impacted many aspects of our lives from the way we shopped, congregated, the nature of work and even employer and employee expectations. This paper will examine several women-owned businesses in the U.S., dispersed geographically and diversified by industry to determine some of the human and financial /economic impact, during our new reality.

Session 6: Sylvan Room 10:50 am – 11:50 am

DISRUPTIONS

Session Chair: *Tracie Dodson, West Virginia Wesleyan College*

Educating through Disruptions: Business Faculty Views on Teaching During the Pandemic

Christopher J. Speicher Marywood University
Amy Washo Marywood University

Colleges and universities are facing an unprecedented situation as they emerge from a global pandemic that has disrupted the higher education environment. Educational institutions must grapple with critical decisions that impact the health and safety of students, faculty, and administration. With vaccines readily available, schools must contend with a divided student and parent population whose perceived hesitation to vaccinate students could impact the higher educational landscape in the upcoming years. Colleges and universities need to determine how they educate both the vaccinated and non-vaccinated student bodies, in addition to deciding whether students must be vaccinated to attend in- person classes and activities. Other concerns include the logistics of internships and inviting outside visitors to campus for lectures, discussions, and events. The financial impact of the pandemic must also be considered as schools make these decisions that affect enrollment as well as the comfort and safety of those who are daily on campus. Data will be presented on the opinions of faculty from several colleges and universities in the United States as they prepare to return to the campus and classroom in a post-COVID-19 environment. Topics
explored include those previously mentioned as well as the role of schools in vaccine education, increased workload demands of faculty, non-traditional teaching methods, and the flexibility of schools to pivot in the event of a resurgence of cases.

The Impact of Covid-19 on Financing a College Education

Karl Malaszczyk Holy Family University
Janet Malaszczyk Cairn University

Covid-19 impacted many aspects of our lives including our financial stability. Many colleges and universities as well as businesses were forced to reevaluate how they operate. Some business and schools were shuttered. Many prospective students were forced to postpone college enrollment because of Covid-19 and lack of funds. Ongoing studies have shown that the consequences of delaying college could have a negative impact on long term financial planning. As we look to the future, a college education is becoming more important and a minimal requirement for most entry level jobs. Financing a college education has become more

difficult and the recent pandemic has caused chaos. Financial support is available from many different sources however the impact of Covid-19 has greatly reduced funding and in some cases, eliminated it. As colleges and universities seek to increase enrollment, the availability of loans, scholarships and grants will play key factors in a student's decision to attend. How did the pandemic affect the future of potential students, their families and the colleges and universities they applied to? How can student loan forgiveness programs impact the future? An overall view of the educational sector will be reviewed. Both direct and indirect variables will be taken into consideration. The future of college financing will forever change as we know it.

Marketing and Promoting Business Graduates in the Middle of a Pandemic: Are Your Students Future-Ready?

Tracie Dodson — West Virginia Wesleyan College
Kim Conrad — West Virginia Wesleyan College

This presentation will cover pathways to successfully navigate the job market during the Covid pandemic combining both human resources and marketing techniques. Presented from an advising perspective, the focus will be on preparing graduates for applying, interviewing, and other pre-career communications. Areas addressed will include the skills needed both in general and relative to changes that manifested from pandemic responses. This includes the typical remote working and virtual meeting components but also additional areas of importance like flexibility, time management, mental stability, etc that will ensure the new hire's success in the position. Suggestions will be provided for resume and application development, focusing on digital submissions but not excluding printed copies, and virtual and in-person interviewing. The goal of the presentation is to provide advisors with tools to help graduates formulate a strong self-promotion to obtain positions that will lead them to a solid business career.

Session 7: Willow Room 10:50 am – 11:50 am

PEDAGOGY

Session Chair: *Theresa Wajda, Slippery Rock University*

Novelty of Voice Thread in Teaching Online Classes

Theresa Wajda — Slippery Rock University of Pennsylvania
Shahriar Gias — Slippery Rock University of Pennsylvania
Anindya Chatterjee — Slippery Rock University of Pennsylvania

With the ever-changing nature of the Covid-19 virus educators from a variety of disciplines were forced to explore how existing and new technological tools could take face-to-face instruction to an on-line environment. Although educators are oftentimes thought to act in isolation in their individual/institutional silos, a remarkable byproduct of the pandemic was the "coming together" of the entire educational community to work jointly in finding new and creative ways to reach and teach students in meaningful ways. Within and across institutions, educators expended time and effort to set up platforms for sharing tips, tools and resources to help other academics achieve their pedagogical goals. To this end, we discovered and adopted the technological tool of Voice Thread© (VT). Although this tool has been around for nearly 15 years, its adoption by institutions of higher education has accelerated exponentially these last several months. In this paper, we discuss our experience with the VT application as well as our novel bent in integrating it with the Zoom platform. In our quest to deliver digital content that was fluid, engaging, interactive and meaningful, we discovered that VT delivered to our expectation. We also saw incredible

opportunities to integrate VT within the Zoom platform for unique learning experiences. In informal polls, our students have told us that they like a mix of synchronous and asynchronous modalities when it comes to digital education. In our collective view, VT is an ideal tool for creating a synchronous-feel in an asynchronous environment.

The Effectiveness of Teaching with Excel - the Learning Outcome from Student Survey

Jui-chi Huang Penn State University

There are at least three ways of knowing the teaching effectiveness: student's perspective, instructor's perspective and quantitative grade comparison. This study is based on a classroom survey, the student's perspective, from an experiment of teaching with Excel in principles of micro- and macro-economics at Penn State Berks in Fall 2020 and Spring 2021. Each chapter comes with a hand-on Excel project. Each project involves learning from the Excel tutorial videos, and creating an Excel file for the data collection, charting, graphing, observing, interpreting and reflecting. The data of each chapter Excel project are drawn from the close related example from the textbook; therefore, students are able to simulate the economic concepts better with the data. This study will conclude with the survey findings of student's perceptions from this teaching-with-Excel arrangement.

Culture Matters in Economic Development: A Cross-Country Comparison

Ruben Berrios Lock Haven University of Pennsylvania

Much of the development literature has focused on the political and economic factors to explain the diverse paths to development. Until recently economists were reluctant to consider culture because it is somewhat broad and difficult to be properly tested. This paper delves into cultural aspects that could be understood as impediments that prevent a country from moving into a mature level of development. The dimensions of culture are vast, but this paper considers only some aspects to help us better understand the impact of culture in shaping an economy. Some of the cultural determinants that have an impact on the economy and can be compared are as follows: the cultural influence of trust and mistrust, respect for the rule of law, attitudes of punctuality versus tardiness, collectivist over individualistic attitudes, strong institutional development vs. weak institutions, long-term vs. short-term orientation, importance of thrift as a moral virtue, and emphasis on work ethic and education.

Session 8: Linden Room 10:50 am – 11:50 am

BUSINESS ETHICS

Session Chair: *Scott T. Stroupe, Penn State University*

Ethics and Compliance: Employee Decisions as they Enter and Conduct Business in International Markets

Jet Mboga Bloomsburg University of Pennsylvania

Long are the days when organizations were dependent on the US economy to increase their profits; today, organizations broaden their horizons and seek avenues to earn sturdier profits by tapping into foreign markets. Within the organizations, there is pressure to meet goals contributing to employee involvement in unethical conduct of offering bribes that are allotted as income tax, worker injury funds and rent, and social security pensions. Does the desire for foreign exposure into global markets contribute to unethical conduct?

This literature review explores ethics and compliance risks that include compromise of the law, disregard of company policies, neglect or report of observed misconduct, and forms of retaliation by those who report misconduct within global markets.

Governmental Response to Vaccine Passports

John C. Cameron Penn State University

Governmental Response to Vaccination Status Abstract The vaccine passport approach affords the individual the ability to demonstrate proof of vaccination. If a person chooses to be vaccinated and is inoculated against the Covid-19 virus, the vaccine passport is a tool that enables the inoculated individual to maintain their own health information for verification purposes. The vaccine passport may include a document, digital record, software application or QR code indicating that a person has been vaccinated. State intervention will need to be considered in light of existing police power that is reserved to the states. In response, states have begun to introduce legislation or executive actions to address the issue of vaccine passports. The vaccine passport approach raises social concerns, public health and safety protections, discretionary requirements, prohibitions, and compliance enforcement. Governmental authority and responsibility in matters of public health emergencies is paramount in order to coordinate and direct appropriate and effective responses. Public health decisions are made in conjunction with health care providers, the private sector, and the general public. Prior research to examine the variances in the policy making associated with health passport legislation or executive action within the United States has been limited. To address this gap in the literature, this paper will examine vaccine passport legislative trends including personal health choice, informed decisions, scope and limits of responsibility, standardized documentation, healthcare right of privacy, right of access and storage and retrieval of patient information.
Keywords: immunization passport, vaccination status, immunity status, proof of vaccination

Sexual Harassment: Can A Six-Week Asynchronous Training Program Improve Upon Single Session Programs in a Bystander's Willingness to Intervene?

Scott T Stroupe Penn State University
Melanie Hetzel-Riggin Penn State University

Headline-grabbing events have highlighted the pervasiveness of sexual harassment and violence. And the workplace persists as a locus of the problem, underscoring a critical issue that demands effective training for existing and future business managers. Educators' reliance on university-wide bystander training to address this need is common, but research casts doubt on the effectiveness of single-session programs. Banyard, Moynihan and Plante (2007). Sustained interaction and training may move the needle on awareness and willingness to intervene (key parameters to achieve the kind of cultural shift necessary to address such an embedded problem). Nation, Crusto, Wandersman, et al. (2003). Moreover, learning management systems create new possibilities for repeated interactive sessions in a hybrid format with asynchronous sessions that can be plugged into existing business courses. This presentation provides an interim report on a pilot program launched to measure outcomes from an asynchronous- format bystander training that runs for six weeks in an introductory business management class.

Session 9: Holmes / Foster 10:50 am – 11:50 am

MANAGEMENT

Session Chair: *Joshua Chicarelli, California University of Pennsylvania*

Entrepreneurs and Flexible Retirement in the Second Half of Life

Rhonda S Clark — Slippery Rock University of Pennsylvania
Rocco Cremonese — Slippery Rock University of Pennsylvania
Rick Terrien — Cntr. for Ageless Entrepreneurs, Inc.
John Golden S — Slippery Rock University of Pennsylvania

A majority of business startups in the U.S. are initiated by persons in the second half of life (40+). Many of these entrepreneurs are working in careers in for-profit as well as non-profit organizations that offer flexible retirement options. The purpose of this research study is to identify employers that offer flexible retirement options (e.g. phased retirement). In addition, it will study how the options are designed, who can access them, and how the programs work to empower entrepreneurs in the second half of life. This research will also assist the Center for Ageless Entrepreneurs (CAE) in its important work supporting later in life entrepreneurs.

Innovative, Social Organic – Alternative Business Model

Paul Thomas Raison — Thomas Jefferson University
John D. Grigsby — Thomas Jefferson University

This paper aims to describe the creation of a new business model to address the need to intervene in systemic issues in an organization (i.e., decision making, role definition, conflict styles, business practices, value proposition, process capability, and data collection) and its community (i.e., alcoholism, blight, crime, disease, drug addiction, education reform, and underserved community unemployment). The aim is also to create a better interdependent connection between strategic management, business model innovation, financial planning, corporate sustainability, and economic development processes to improve systemic issues in an organization and in a community permitting the organization to perform effective and efficient social and financial initiatives. This paper is an innovative perspective on an alternate business model after contributing a viewpoint into the business processes of an organization's current business model. The scope of the literature review covered the five spheres used to formulate an alternative business model named the business processes. The case study poses the qualitative approach using three hypotheses to explain business processes' interconnection phenomena. After the data collection, the Alternate Business Model (ABM) theory was the diagnostic or active interdependent operation of all the processes to formulate a strategic plan to change systemic issues. In this case, the ABM was more diagnostic rather than active dynamic. Finally, I contribute as implications just how an organization may use tools, methodologies, and the components of the ABM to change social practices.

Session 10: Logan / Harris 10:50 am – 11:50 am

TECHNOLOGY / DISRUPTION

Session Chair: *Adnan Chawdhry, California University of Pennsylvania*

Mapping Cumulative Resiliency Indicators of Hte: Examples from Pandemics

Noel M Criscione-Naylor Stockton College

The hospitality, tourism, and event industry (HTE) has demonstrated a history of adaptability to survive and quickly regain positive growth despite a variety of disturbances including but not limited to natural disasters, attacks on human freedoms and life, and the spread of infectious disease. Most recently, COVID-19 has proven to be one of the most debilitating global phenomena that has impacted all sectors of the industry with government mandated business closures and travel restrictions, enforced operational protocols and capacity constraints, and individuals' overall concern for health and safety. This cumulative case study groups resiliency indicators providing insight into the strengths and limitations of recovery efforts surrounding health disturbances and where opportunities lie for progress. A review of resiliency assumptions and crisis management practices are reviewed describing the implications and rationales, and highlights challenges recovery efforts face.

Artificial Intelligence Function Mapping to Calibrate the Determinants of SMME Performance

Helper Zhou Durban University of Technology
Gordon H Dash University of Rhode Island
Nina Kajiji University of Rhode Island

Various studies have been carried out to establish the key drivers impacting small enterprise performance in developing countries. Despite many policy-oriented studies to uncover the structure of SMME performance in emerging markets, SMMEs continue to demonstrate lagging performance. Guided by a history of linear- and log-linear econometric model estimation that ignores potential network effects, our study extends the literature by implicating SMME performance as a production network. Using an enhanced Radial Basis Function Artificial Neural Network (i.e., K4-RANN), performance (factor) elasticity coefficients are derived from the estimated nonlinear regression weights. We find urban-based SMMEs experience negative elasticity compared to their rural counterparts. Further, this study provides detailed evidence of how gender impacts SMME performance. A confirmatory analysis was conducted to establish the extent to which SMMEs are aware of the impact (magnitude) and effect (positive/negative) of the specified performance factors. Generally, we confirmed that SMME owners in KZN are not aware of the relative importance of key performance factors.

Session 11: Sylvan Room 1:05 pm – 2:05 pm

PEDAGOGY

Session Chair: *Marcia Joan Kurzynski, Lock Haven University of Pennsylvania*

Teaching and Engaging Generation Z After Covid-19

Marcia Joan Kurzynski — Lock Haven University of Pennsylvania
Cori Jo Myers — Lock Haven University of Pennsylvania

As Generation Z (Gen Z) continues to matriculate at colleges and universities, faculty continue to search for ways to engage them in the academic and social dimensions of college to promote student learning, retention, graduation, and job placement. Pre- and Post-COVID literature on Gen Z and pedagogical strategies promote greater use of active learning strategies that are shorter in length, personalized, technology-infused, and social. Peer mentoring programs provide an effective way to socialize new students and integrate learning strategies with these attributes and documented outcomes. This paper provides selected thoughts about supporting Gen Z using a peer mentoring program that was established based on best practices and revised over a six-year period to keep current with student engagement literature and changing student preferences.

Fitbit Watch Your Fundamentals

David Jensen — Bucknell University
Stacy Mastrolia — Bucknell University
Curtis Nicholls — Bucknell University

Extensive literature has shown that students learn best by using experiential learning techniques. In this active learning exercise, we provide educators with a comprehensive experiential learning tool that they can use to help students understand the content of both the publicly available financial statements and the Management Discussion and Analysis (MD&A). Because undergraduate students tend to struggle to understand theoretical concepts that they have no real-world experience with, we chose to use a company (Fitbit) and product that is both familiar and relevant to them in order to demonstrate how strategy, strategic decisions and strategic challenges impact a company. In the case of Fitbit, their strategy, strategic decisions and strategic challenges were often clearly visible and reported in their external financial reports. By showing students these "clues" and showing them how to identify strategic concerns from publicly reported documents for a company and industry they are familiar with, we hope to build both their knowledge of strategy and their confidence in investigating the strength of a company's core strategies. By their IPO in 2015, using a product differentiation business strategy and their first-mover advantage, Fitbit unquestionably had the dominant market share in the young fitness tracking market; by 2017, they had lost their product market share and, relatedly, their market dominance. In hindsight, the strategic challenges Fitbit faced were known and publicly acknowledged, yet the company still fell prey to their competitors, most notably Apple and the Apple Watch introduced in 2015.

The Question Of Integrity: A Discussion Of The Perceived Impacts Of Covid-19 And Distance Learning On Honesty In Academic Submissions

Tracie Dodson West Virginia Wesleyan College
Kelly Sharp West Virginia Wesleyan College
Kim Conrad West Virginia Wesleyan College
Joshua Beck West Virginia Wesleyan College

The rapid onset of online education, and lack of preparedness to teach and learn online, provided a fertile ground for violations of academic integrity. This panel seeks to present our data-driven concerns and open a discussion of mechanisms that can be utilized to positively intervene and prevent violations of academic integrity through education. Institutional data and available trend data will be shared, questions for thought will be proposed, and suggestions to proactively prevent further student issues will be made. The primary purpose of this session is to open a dialog for educators and administrators to discuss best practices and potential new solutions to a problem that has increased exponentially since March 2020.

Session 12: Willow Room 1:05 pm – 2:05 pm

HEALTHCARE ADMINISTRATION / DISRUPTIONS

Session Chair: *David Jordan, Slippery Rock University of Pennsylvania*

Five Financial Lessons from Elder Law for Healthcare Administration

Donald Mong Slippery Rock University of Pennsylvania

With 57 million elders soon using the US healthcare system, elder issues are becoming more important to healthcare administration. Substantive material for lessons concerning elder law's financial impacts on healthcare administration is presented. Lessons include revenue impacts, changes in elder financial behavior, quality-of-life impacts during healthcare treatment, elder capacities for healthcare decision-making, and impacts from elderly healthcare employees. A brief epilogue on the Fall 2021 introduction of the lessons into a healthcare administration law classroom concludes the article.

Covid-19 Older Adults and Malnutrition: Role of dietary Mobile Apps

Fauzia Mahr Penn State College of Medicine
Rhoda Joseph Penn State University

Older adults (OA) are a rapidly growing cohort of the United States (US) population, and malnutrition is one of the most common medical issues facing this population. The Covid- 19 pandemic has increased the risk for malnutrition due to social isolation and food insecurity. At the same time, there has been a significant increase with the utilization of digital products and services (De', Pandey, & Pal 2020). This paper explores if mobile apps address the issue of malnutrition and examines, how these apps are tailored to the specific needs of OA and why they may be useful during and after the pandemic. We analyze current nutritional apps, discuss existing challenges, and provide recommendations to improve nutritional outcomes for OAs. Our findings indicate that well- designed mobile apps can support efforts to alleviate malnutrition in OA.

Session 13: Holmes / Foster 1:05 pm – 2:05 pm

ECONOMICS / FINANCE

Session Chair: *Norman Sigmond, Kutztown University of Pennsylvania*

Bank Runs and Panics; déjà vu
Conway Lee Lackman — Duquesne University (Retired)
William Carlson — Duquesne University (Retired)

Several factors can cause instability in the banking system and lead to bank runs. Reserves less than 100% of deposits mean that the bank cannot meet the withdrawals of everyone all at once. Large loan defaults threaten the bank's ability to pay its depositors. Long-term loans do not mature fast enough to pay off depositors. Secondary reserves can help but Treasury Bills were not issued until 1929 and commercial paper markets can freeze in panics as they did in 2008. Four modern factors have improved liquidity compared to the 1800s: Borrowing from the Fed became available when it started operations in 1914. Repos were introduced by the Fed in 1918. Overnight borrowing by banks from other banks in what is known as the federal funds market began in the summer of 1921. But in 2008, these were not enough. The last resort is what Treasury Secretary Hank Paulson (his book "On the Brink") called the "Big Bazooka" – The Bailout – which has turned into a big political and economic problem. It is 173 years after the Panic of 1837, and it still is not clear that the financial establishment knows what it is doing.

Exploring the Connection Between Information and Communications Technology Ict Financial Inclusion Fi And Economic Growth

Kshama Harpankar — Lebanon Valley College

This study explores the role of ICT (specifically: mobile phone penetration) as a driver of economic growth in sub-Saharan Africa. ICT developments can have a positive impact on economic growth via two channels: ICT development can lower information costs and facilitate more efficient resource usage, thus contributing to economic growth. ICT development can also contribute to economic growth via financial inclusion. Using a panel dataset of 46 African countries for the time 2004-2018, we analyze the impact of mobile phone penetration on economic growth in Africa. With the help of dynamic panel data models, we also investigate the interaction between ICT development and financial inclusion as drivers of economic growth.

Session 14: Logan / Harris 1:05 pm – 2:05 pm

ACCOUNTING

Session Chair: *Karen Robinson, York College of Pennsylvania*

Diversity and Inclusion in Accounting

Karen Robinson — York College of Pennsylvania

The primary goal of this proposal is to invoke a discussion on whether true diversity and inclusion exists in the field of accounting. This researcher is concerned that the lack of diversity and inclusion in accounting firms, college and university faculty and textbook materials may be one of the reasons that there has been

a steady decline in students of color enrolling in and graduating from US accounting programs. The purpose of this research is to test the validity of this theory by examining current literature to explore the bases for this theory and determine what the industry is doing to improve the pipeline. Additionally, the researcher will look at the makeup of the accounting department of colleges and universities in the Northeastern United States (Pennsylvania, Maryland, Delaware, New Jersey, New York, Virginia and Washington, DC), and review textbooks from the three major publishers (Wiley, McGraw-Hill and Pearson) for representation of people of color to further test the validity of the theory. The use of outcomes from this research presentation may provide aid to students, university administrators and faculty, researchers, and the industry at large.

Investigating an Approach to Sensitive Information to Improve Response Rate in B2B Marketing

Kenneth D Hall Bloomsburg University of Pennsylvania

Survey response rates in general are characterized as low and declining in a variety of settings (Blumenberg et al 2019; Czajka and Bayler 2016; Dennis 2003; Kennedy and Hartig 2019; Sheehan 2001), and business research is not immune (Dennis 2003; Larson 2005; Mellahi and Harris 2016), with response rates as low as 2.5% in some mail surveys reported (Larson 2005). The problem may be compounded by requests for sensitive information (Markos, Milne, and Peltier 2017). In the business-to-business research setting sensitive information might consist of items such as sales revenue for privately held firms not required to disclose their financial data. It may be beneficial, therefore, to develop quantitative measures that can serve the function performed by sensitive information – in particular, a quantitative dependent variable – while requiring less disclosure of sensitive information. This study discusses a measure developed and deployed (intended as the dependent variable) to an online panel of managers of companies involved in B2B sales across national borders. Instead of asking for dollar sales figures, respondents were asked to provide a percentage of sales target achieved (85%, 103%, etc.). Deployment and implementation of the measure are discussed. References (available on request)

Session 15: Sylvan Room 2:20 pm – 3:20 pm

PEDAGOGY

Session Chair: *John Grigsby, Thomas Jefferson University*

How Business Educators Stay Current in their Field of Expertise

Stephanie Adam California University of Pennsylvania
Alex Adams California University of Pennsylvania

In today's fast-paced, dynamic business world things are changing at an ever-increasing speed. Updates to laws, policies, and practices occur almost daily. Additionally, the demands placed on educators to handle administrative and pedagogical standards at their universities seem to never cease. This talk will focus on research related to "staying current in one's field of expertise." When tasked with so many roles, how do business educators at the collegiate level stay relevant to what is happening in today's corporate organizations? We will discuss practical, research-based approaches to achieving professional development goals as well as constraints to achieving them. Our students now, more than ever, look to us to be well-rounded in pedagogy as well as practice. Together, we will examine the "how to" aspect of making sure we can achieve the standards placed upon us.

The Mba Degree - How Long Will the Rise Last

Linda A. Hall State University of New York at Fredonia

Over the past 30 years the demand for MBA degrees has risen and fallen several times, however, as recently as 2019 the degree's demand experienced its greatest decline and was even declared dead. Several higher education institutions closed programs. Now in 2021, it seems there's been a resurrection, as applications to MBA programs are increasing at record breaking levels. What's behind the fall and subsequent rise? How long will it last? What are the implications for institutions of higher education?

Session 16: Willow Room 3:25 pm – 4:25 pm

PEDAGOGY / ACCREDITATION

Session Chair: *David Jordan, Slippery Rock University*

The Impact of AACSB Accreditation on Freshmen Enrollment: A Preliminary Study

Lisa Marie Walters State University of New York at Fredonia
David Jordan Slippery Rock University of Pennsylvania
Mark Nickerson State University of New York at Fredonia

The Association to Advance Collegiate Schools of Business (AACSB) is the world's largest business education association (www.aacsb.edu, retrieved July 9, 2021). Its mission is to "foster engagement, accelerate innovation, and amplify impact in business education," which is aligned to its vision of "transforming business education globally for positive societal impact' (www.aacsb.edu, retrieved July 9, 2021). With less than 5% of the more than 16,000 business schools worldwide earning this prestigious accreditation, those business schools with AACSB accreditation should have a competitive advantage with regard to recruitment of freshmen students. This study will provide a preliminary analysis into the impact of AACSB accreditation on the recruitment of freshmen at two public universities in similar rural locations. The analysis will evaluate the economic conditions of the geographic recruitment areas for both universities to provide a comparative basis for control. It will evaluate the pre-accreditation recruitment results stratified by fall and spring semesters for the previous three years leading to the accreditation, and then statistically compare the results to three years post-accreditation. We hypothesize that the AACSB accreditation does not have a significant role in and of itself on freshmen recruitment with regard to this preliminary study. Further study will be warranted, including marketing efforts and student awareness of accreditation as well as a larger scope of study.

Session 17: Holmes / Foster 3:25 pm – 4:25 pm

MANAGEMENT

Session Chair: *Bronwyn Laughner, Bloomsburg University of Pennsylvania*

Politically Connected Directors and Corporate Governance

Justin Mindzak State University of New York at Fredonia

Research has shown that firms can benefit when they are politically connected. The extant literature has shown that politically connected firms benefit from procurement contracts, reduced regulatory issues and lower costs of capital. However, with more politicians joining corporate boards, the effect of political connectedness on corporate governance remains unclear. This paper examines the association between politically connected directors and corporate governance. A sample of high-ranking politicians that have joined firm boards of directors is examined. I find that firms with politician directors have higher corporate governance scores. Additional tests also indicate that an addition of a politician to a board of directors increases the governance quality.

Impulse Consumption and Attitude: A Study of Instant Consumable Snack Food Purchases

Renee C Tacka York College of Pennsylvania

Traditional impulsive buying research focused on low involvement goods; however, the growth of the internet has extended impulsive tendencies into categories that normally were not considered impulsive. The purpose of this research was to extend consumer impulsivity into the category of impulse consumption by analyzing purchases of instant consumable snack food (ICSF) products, which are bought and consumed in 30 minutes or less. The goal was to identify if a relationship existed between a shopper's attitude classification – cognitive or affective – and four purchase characteristics of instant consumable snack food (ICSF) products: (H1a) type of product, (H1b) store channel shopped, (H1c) frequency of ICSF purchase, and (H1d) time of day purchased. Data was collected using a custom survey instrument administered via Springboard America, one of the leading online market research communities in the U.S. Respondents were randomly selected, from the U.S. and had shopped in-store at least three months prior. Overall, *effectively oriented* shoppers participated in the category at a broader and deeper level, especially with regard to product type, store channel, and frequency of purchase. The findings from this study close a gap in academic research because there was no evidence that past research had either differentiated impulse purchases from impulse consumption or created a link between consumer attitude and ICSF purchases. In addition, the outcomes from this study offer marketers a new way to think not only about impulse buying, but also the activities used in-store to increase engagement and drive purchases.

The Value of Knowledge: Maximizing Knowledge Management in Family Business Succession Planning

Bronwyn M. Laughner Bloomsburg University of Pennsylvania

The vast majority of family-run businesses do not survive until the third generation of leadership. Many of the previous studies have focused on preparing the successor and minimizing family conflicts. As some previous literature has suggested, the strength and the weakness of a family-run business is that it is family-run. While the family bond can increase loyalty and support systems, sibling rivalries and family issues can

greatly impact the company's intrarelationships. Further, each business transfer has three components: legal, financial, and knowledge. Most succession planning is discussed in terms of how to share ownership, what the estate planning and tax implications are, and how to ensure the predecessor is able to retire as he or she wishes. This study, however, aims to examine the knowledge transfer piece of the succession. How does a parent-predecessor capture the knowledge accumulated over 20, 30, or even 40 years in the business and pass that along to the child(ren) as part of the successor preparation process? The effective management of the firm's knowledge, a very valuable but intangible asset, in particular the tacit knowledge, is critical in ensuring that the next generation is well equipped for success.

Session 18: Sylvan Room 3:25 pm – 4:25 pm

PEDAGOGY

Session Chair: *Kelly Sharp, West Virginia Wesleyan College*

Should business courses be embedded into the general education curriculum? A comparative analysis

Joshua Joseph Beck West Virginia Wesleyan College
Kelly Sharp West Virginia Wesleyan College

With a few exceptions, most courses taught within the business curriculum are excluded from traditional general education programs. This presentation compares the outcomes of general education and business classes and questions if the exclusion is warranted in an outcome-driven general education model. An examination of the learning outcomes is used to demonstrate that many upper-level business classes meet the learning outcomes of introductory general education programs. In addition to meeting general education requirements, due to their intersectional nature of knowledge, and course level, these courses encourage students to think critically and address employer and societal needs. As higher education institutions look to move toward a more outcome-driven approach to learning and assessment, the role of business courses should not be overlooked. This comparative analysis identifies courses that easily meet the learning outcomes and suggests courses that could be modified to more broadly serve the student bodies at institutions of higher education.

How Do Audience Response Systems Influence Student Engagement and Learning in Large Classes?

Liz Wang West Chester University of Pennsylvania

Large classes are associated with challenges in delivering high-quality learning experiences and negative effects on academic performance (Maringe & Sing, 2014). Audience response systems (ARSs), such as Poll Everywhere, are recognized as valuable technologies for enhancing student engagements and learning outcomes in higher education (Wood & Shirazi, 2020). Yet, few studies investigate the underlying mechanism regarding why and how students become engaged with ARSs. Student academic achievement is influenced by a combination of academic and social engagement in the learning process (Finn, Pannozzo, & Achilles, 2003). Academic engagement refers to student class participation, and social engagement is how students interact with peers and instructors. ARSs provide opportunities for interactions between the teacher and the students and can act as a catalyst for peer discussion. This study proposes that student's perception of ARS may influence their academic (participation) and social engagements (peer and teacher interactions), thereby impacting learning outcomes (perceived knowledge and communication outcomes). This study surveyed 143 students from a large class where Poll Everywhere was used for a semester. The results reveal the direct and indirect effects of perceived ARS on student engagements and learning outcomes. Practical suggestions are offered to use ARSs in teaching large classes.

Case Study: Nine Motivators of a Non-Traditional Student

Robert John O'Connell York College of Pennsylvania

The purpose of this case study is to identify motivators that may be unique or more significant to the non-traditional student. By understanding these motivators, higher education institutions may be better able to target this student segment. This case study is observational but with a big caveat. Rather than planned and structured like much scholarly research, this may be viewed as somewhat anecdotal, stretching into personal recollections; initially, as a non-traditional undergraduate student in Thailand with the University of Maryland, Far East Campus in 1972, culminating with a DBA in 2012, and overlapping with current teaching of traditional and non-traditional undergraduate students at the Graham School of Business, York College of Pennsylvania. So, covering 49 years makes this research longitudinal, with observation of both the researcher and the subjects, resulting in the paradox of the student eventually becoming the teacher and being observed first as a student and then as a teacher. Therefore, most of this paper addresses that journey through recollections of the paths taken and the events and motivations for following those paths. At significant events in this journey, this researcher identified nine motivational points directing this non-traditional learner. When some decision points occurred the destinations to which the student was directed may have been unknown. However, in hindsight some motivations later seemed evident and, eventually short-term and long-term destinations were chosen. This review is not correlated to existing research but identifies motivators that can form the basis for a later formal research and comparisons to literature.

Session 19: Willow Room 3:25 pm – 4:25 pm

CRYPTOCURRENCY / TECHNOLOGY

Session Chair: *Helper Zhou, Durban University of Technology, South Africa*

Cryptojacking: Attacks and Mitigations

Andrew Mangle Bowie State University
Ayandayo Mary Adeleke Bowie State University

Cryptojacking is an emerging risk that has negatively affected individuals and even large organizations. This form of attack has rapidly increased due to the increasing benefits derived from cryptocurrency and the perpetrators of this attack enjoys the rewards without having to make use of their resources. The high volume of resources needed for cryptomining also contributed to the rise in cryptojacking activities. Motivated by the rise of cryptojacking, researchers have taken the effort to provide various detection and prevention methods to ensure effective security against the attack. To determine the extent of cryptojacking activities, this paper examined different models developed by researchers which revealed the high rate of cryptojacking activities on websites and some of the methods developed by them were able to disrupt the operations of attackers. This paper aims at promoting the implementation of effective security against cryptojacking attacks and best practices were proposed to prevent cryptojacking attack.

Cracking Bitcoin Via Quantum Computing

Andrew Mangle — Bowie State University
Farida Keter — Bowie State University

Quantum computers can solve problems with a radically different complexity to digital computers. Quantum computing is the only known technology that can be exponentially faster than classical computers for specific tasks, potentially reducing calculation times from years to minutes. Quantum computing has the potential to compromise Bitcoin's security in three ways. One, by mining more than classical computers, can by cracking Bitcoin's cryptographic keys. Secondly, the computational power of a quantum computer can be used to break the elliptical curve signature scheme used by bitcoin. Thirdly, outcompeting the majority of validators on the network to generate a false but accepted consensus. Finally, quantum computers can use Grover's algorithm to accelerate the generation of hashes, which enables recreating the entire blockchain. The findings suggest quantum computers could be used to crack Bitcoin wallets using Shor's algorithm and out-compete digital computers, thus posing a legitimate threat to Bitcoin's current software.

Service-Oriented Architecture & Artificial Intelligence-Based Chatbot System Analysis and Design

Abdou karim Jallow — Slippery Rock University of Pennsylvania
Luke Lofton — Slippery Rock University of Pennsylvania
Baileigh Carter — Slippery Rock University of Pennsylvania

Businesses all over the world, in particular retail are always striving to strengthen relations with customers. One of US's largest grocery chains is faced with the difficulty of handling influx of customer requests received pertaining to products and services they provide relying entirely on the customer service center. Customers are unable to obtain answers and get support after the customer service center is closed. As a result, there was the need for the use of technology to extend beyond the customer service center. The purpose of the study was to investigate the use of information technology to enable customers to request for services with minimal or no human involvement. It presents the analysis and design of a chatbot system as a real-time virtual assistant to serve as a substitute. Qualitative research methods were used to collect data. These include feasibility study and requirements gathering. A joint application development (JAD) session was held during the requirements gathering, design and validation phases. Thematic analysis was used to analyze the data. Based on the results, a chatbot system was designed centered on service-oriented architecture (SOA) and artificial intelligence (AI). The system comprises of the following layers: user, intelligence, webservices and database. The study offers a practical design solution, and the validation indicates that when implemented, the system may improve the customer service process. It will contribute to knowledge to both academia and industry on the design of interactive and intelligent tools for service delivery.

Session 20: Holmes / Foster 3:25 pm – 4:25 pm

ECONOMICS

Session Chair: *Hanafiah Harvey, Penn State University*

Examining the Impact of SoFi Stadium on Local Property Prices using Socio- Economic Stratification Data Analytics and the Zillow ZTRAX Database

Brad J Congelio Kutztown University of Pennsylania

In February of 2016, Stan Kroenke – the owner of the Los Angeles Rams – argued that the construction of the team's new stadium in Inglewood, California would, with a $5.5 billion price tag, create a "ripple effect so profound" that it would "boost the neighborhood's subpar property values along the way." Kroenke made his point while ignoring what an increase in property value can produce through such a gentrification process: marginal damage to the local education system as neighborhoods skew towards higher-income residents, the depletion in long-term viability and supply of "low-cost housing," and the "deepening class polarization" within the neighboring urban housing markets are among just some of the chief concerns. To examine Kroenke's claims and the underlying socio- economic issues, this paper uses the Zillow's proprietary ZTRAX database to, first, construct a standard difference-in-differences model to explore whether the construction of SoFi Stadium did indeed boost the neighborhood's property values. After, by using the `tidycensus` package in the R programming language, socio-economic factors will be explored at both the county subdivision and census tract levels.

Revisiting New Zealand Trade Balance and Exchange Rate: Evidence from Asymmetry Analysis

Hanafiah Harvey Penn State University

With recent trend on empirical studies of trade balance and exchange rates focusing on non-linear approach supply new insight in the case of New Zealand. Earlier empirical study is limited and unsuccessful to provide a dedicated support for J-curve on the long run. This paper adds new case study between New Zealand and her 13 trading partners. Following an innovative approach using the non-linear method supply rewarding results. The results show that not only the short-run effects of exchange rate changes are asymmetric in all models, and it also lasted into the long-run significant asymmetric effects in the cases of China, Hong Kong Indonesia, and Switzerland.

Session 21: Logan / Harris 3:25 pm – 4:25 pm

MANAGEMENT

Session Chair: *Laura Cruz, Penn State University*

Managerial Ways of Thinking: Rethinking the Pedagogy of Business Management through a CSR Lens

Laura Cruz — Penn State University
Maung Min — Penn State University

In this interactive presentation, we argue that the historical resiliency of the four principles of management (planning, organizing, leading, and controlled), coupled with the opportunities afforded by the recent shift to the corporate social responsibility (CSR) model, together serve as the basis of a different approach to business management pedagogy; one that shifts the focus of teaching from imparting specific skills and bodies of knowledge to equipping students with managerial "ways of thinking." We present the results of a research study, conducted over three semesters, in which business management students (n=65) engaged in a series of cooperative learning exercises that asked them to apply these managerial ways of thinking to a previously unseen case studies that integrated a CSR perspective.

Our mixed methods study found evidence not only of the students' collective abilities to transfer knowledge, but also of the process by which they navigated the process; worked through challenges and setbacks, navigated the ambiguity of the circumstances of the cases, and found their individual and collective voices. While there was certainly variation in the degree to which each student mastered these tasks, our analysis provides valuable insight into how students come to embrace managerial ways of thinking and how they might be able to apply these dispositions across multiple contexts.

Special Session: Sylvan Room 4:30 pm – 5:30 pm

BEST PAPER PRESENTATION

Dividend Policy for Firms with Negative Book Value of Equity

Richard Paul Hauser — Gannon University

This paper investigates whether negative book equity firms have a dividend policy and whether that dividend policy is different from positive book equity firms. In most prior studies of dividend policy, firms with negative book equity (NBE) are specifically excluded from the data sample. NBE firms have been perceived to be financially distressed and insignificant. However, recent studies of NBE firms by Jan and Ou (2012), Ang (2015), and Luo, Liu, and Tripathy (2021) find evidence that the percentage and frequency of NBE firms is increasing, and a portion of NBE firms are financially and operationally healthy, which suggests that some NBE firms potentially have a dividend policy. Based on analysis of the summary statistics and logit regressions, this investigation of the 2020 NBE dividend paying firms indicates that the negative book equity (NBE) dividend payers have the same firm characteristics as positive book equity (PBE) dividend paying firms. This study shows that the 2020 NBE dividend payers are larger, more profitable, older, and have higher earned capital - identical to the prior research of positive book equity (PBE) dividend payers. Moreover, logit regression analysis of NBE dividend growing firms indicates that the same

characteristics [larger market equity size, higher profitability, and lower volatility] that increase the probability of being a PBE dividend growing firm also increase the probability of an NBE dividend paying firm growing the dividend in 2020.

Session 22: Sylvan Room 9:15 am – 10:15 am

ACCOUNTING / TAX

Session Chair: *Mark Nickerson, State University of New York at Fredonia*

The Needed Increase of Sales Tax Bases for State Sustainability

Andrew Junikiewicz Albright College

The purpose of this presentation is to discuss the numerous sales tax bases that states have imposed to increase their revenue for their sustainability. Sales taxes are an important and vital revenue base for states to manage their ever-increasing budgets, while trying not to impose an increase in their individual or corporate income taxes. Generally, increasing the individual and corporate tax bases tends to lead to political consequences as well as citizens and companies departing from the state revenue base. This research provides the numerous sales tax bases that states have accepted to increase their revenue base as well as the impact this revenue base has compared to the corporate and individual taxes collected.

The Gift That Keeps on Giving: The Volunteer Income Tax Assistance VITA and Social Learning

Qiongyao Zhang Robert Morris University
Chenchen Huang Carlow University
Marsha Huber Institute of Management Accountants
Raymond Shaffer Youngstown State University

Researchers collected longitudinal data to measure the social learning aspects of the IRS- sponsored Volunteer Income Tax Assistance (VITA) program. VITA helps low-income taxpayers prepare and electronically file (e-file) their tax returns. Trained volunteers prepare about 3.2 million returns each year. This study investigates the long-lasting benefits that VITA clients gain beyond the free tax preparation service. Social learning theory suggests that individuals observe and mimic others' social behavior as they learn. Based on 1,522 surveys collected at one VITA site from 2011 to 2016, we observed significant differences between first-time and returning clients. Returning VITA clients are more likely to understand what e-file means and to use the service. Returning VITA clients also showed greater financial literacy, more likely to have a retirement account, use credit cards, and own a home. The researchers hypothesize that returning VITA clients gain tax and finance knowledge through social contact with the volunteers that prepare their tax returns. This preliminary finding suggests that VITA programs provide an important social learning opportunity for low-income taxpayers.

The Changing Audit Environment: Reflections on the Auditing Curriculum and Textbooks

Y. Bora Senyigit King's College

The auditing profession is currently striving and promoting the use of data analytics and digital technologies significantly. COVID-19 has accelerated this transition toward new ways of operating. As data analytics and digital technologies have become central to the audit process, the auditing curriculum and textbooks

have been changed to adapt themselves to a fast-evolving audit world. The purpose of this study is to contribute to the discussion on whether the changes in the audit environment are reflected in the curriculum and textbooks. We first explain the major changes in the audit environment such as changes in the use of data analytics and digital technologies. After that, we conduct a content analysis of the auditing curriculum and textbooks at the AACSB accredited institutions. Based on our analysis, we make suggestions to improve the auditing curriculum and textbooks in line with the changes in the audit practice. We consider this paper to be of particular interest to audit educators and textbook publishers.

Session 23: Willow Room 9:15 am – 10:15 am

PEDAGOGY

Session Chair: *Anthony Rodi, University of Pittsburgh*

The Relation Between Social Media and Students' Academic Performance in United State Higher Education: A Mixed-Method Study

Abdulaziz Y Bahha — Lander University

The purpose of this mixed-method study is to examine the relationship between social networking by students and the enhancement of learning of business and management students in institutions of higher education of the US. The researcher conducted a literature review while proposing this topic for the dissertation. During the literature review, it is found that there was a significant research gap in the literature regarding the impact of social networks on the business management skills of students despite the fact that educational institutes in the US were rapidly implementing those networks. A large number of educational institutes have implemented social networks. Still, not much research has been conducted regarding the impact of these networks on the professional development and management skills of business students. Therefore, after identifying this research gap, the researcher is proposing to fill this research gap by conducting a primary study analyzing the impact of social networks on the management skills of students.

Understanding Student Learning and Opinions Using Different Teaching Modalities

Kuan-pin Chiang — Central Connecticut State University

The COVID-19 pandemic has become a global health issue and has forced higher education institutions to adapt to different course delivery methods. Teaching modalities such as online (synchronous or asynchronous) and HyFlex have been introduced. To understand learning effectiveness and students' opinions of teaching modalities, this study analyzes data and presents results from four sections of an undergraduate marketing course, two face-to-face prior to the pandemic, one taught online asynchronously and the other with HyFlex.

Cyber Ethics Education Accelerator Grant Activities

Anthony Rodi — University of Pittsburgh
Jennifer Petrie-Wyman — University of Pittsburgh

The grant funded collaborative partnership between the Katz Graduate School of Business, College of Business Administration, School of Education, and additional partners have developed a project aimed at supporting cyber ethics education in K-12 education in Western Pennsylvania in the form of a Cyber Ethics Education Accelerator. The objective of this project intends to improve the pipeline of underserved

students entering the cyber workforce and expand the abilities of existing K-12 teachers to be more prepared, skilled, and agile in cyber ethics to support and amplify student interest and excellence in cyber education. An interdisciplinary focus to cyber ethics education is required as the cyber workforce spans across business, the public sector, and STEM industries. In addition, the project aims to support (1) student and teacher in-person or virtual workshops targeting cyber ethics education awareness and skill development and (2) provide a gap analysis to survey the specific cyber ethics needs of K-12 students in underserved schools in Western Pennsylvania. This paper reflects on the outcomes and successes of the partnership project on K-12 educator cyber awareness. Core topics in the 3-part training will include: cyber security and privacy, the ethics of cyber-use (especially on youth), cyber justice, and the humanity in cyber.

Session 24: Holmes / Foster 9:15 am – 10:15 am

FINANCE

Session Chair: *Richard Paul Hauser, Gannon University*

The Search For Alpha And The Public Firm Response

James Bulsiewicz — Fairleigh Dickinson University
Xiaohui Yang — Fairleigh Dickinson University
Karen C. Denning — Fairleigh Dickinson University
E. James Cowan — Fairleigh Dickinson University

Financial theory indicates that idiosyncratic risk may be important to investors that hold under-diversified portfolios. We investigate this issue by looking at hedge fund activism and target firm returns. We find that changes in idiosyncratic risk have an asymmetrical relation within positive and negative abnormal return samples. Changes in idiosyncratic risk have positive relation within target firms with positive abnormal returns and a negative relation within negative abnormal return target firms.

Gender Gap In Access To Credit For Small Enterprises

Victoria Geyfman — Bloomsburg University of Pennsylvania
Alexandra M. Papageorgiou — Citigroup

Small businesses continue to play a major role in the US economy. Whether a business is woman-owned, man-owned, or equally owned, having access to capital is essential to support daily operations of small enterprises and to ensure their long-term viability. According to Small Business Credit Surveys (SBCS) conducted by the Federal Reserve, bank credit accounts for almost half of all financing for small businesses. This paper examines the disparities in access to small business credit based on the owner's gender. While both men- and women owned businesses apply for bank credit at a similar rate, the data reveals that women-owned businesses experience higher barriers to access and face more financial challenges compared to their male counterparts. We found that on average, loan applications from women owned businesses are less likely to be approved. Additionally, there are notable gender differences in the likelihood of approval for the full amount of funding requested. These findings suggest a possible gender gap in access to credit. The paper discusses the implication of these results and proposes policy recommendations.

The New Revenue Recognition Standard and The Stock Price Reaction

Tibebe A Assefa — Bowie State University
Sunando Sengupta — Bowie State University
Satina Williams — Bowie State University

This paper investigates whether abnormal returns exist around the announcement of changes in accounting principles (The New Revenue Recognition Standard (NRRS)). On May 28, 2014, The Financial Accounting Standards Board (FASB) and The International Accounting Standards Board (IASB) issued new guidance for companies recognizing revenue in contracts with customers. Accounting Standard Update (ASU) No. 2014-09, Revenue from Contracts with Customers (Topic 606). We analyzed the impact of the Announcement of the NRRS and the Stock Price Reaction. Earlier research has shown that announcement events related to stock-generated investor reactions tend to affect the stock prices of the companies that are involved in the transactions. Our sample consisted of the 30 Companies from The Dow Jones Industrial Average. We first identified the announcement or event date, which was on May 28, 2014 and then utilize the Event-Study methodology Eventus, from the Wharton Research Database (WRDS), to test for the presence of abnormal returns around the event dates. Our results showed a statistically significant of 4.32% Mean Cumulative Abnormal Returns (CAR) thirty days before the announcement. This indicated that Investors were optimistic about the announcement of NRRS. Investors felt that NRRS improved transparency and earnings in the Financial Statements and were willing to pay higher prices. On the contrary, the results showed a significant negative Cumulative Abnormal Return (CAR) of -0.29%, from 1 day before the announcement date up to the announcement date, which could be due market correction of the earlier up tick.

Session 25: Sylvan Room 10:30 am – 11:30 am

HEALTHCARE ADMINISTRATION

Session Chair: *Natalie Dick, Slippery Rock University of Pennsylvania*

Access to Maternity and Obstetric Care in Rural Pennsylvania

David Doorn — West Chester University of Pennsylvania
Sharon Dejoy — West Chester University of Pennsylvania

In this paper we assess current and projected access to quality maternity care in the rural counties of Pennsylvania. Such access is a critical component of positive birth outcomes, particularly in rural areas where multiple barriers to such services often exist. In making this assessment we do a supply and demand analysis of current and projected future needs and whether or not they are being met and are likely to continue to be met by particular medical service providers in the specialties that pertain. In conducting the analysis, we make use of federal and state level data that is publicly available and look at the county distributions across the rural areas of Pennsylvania. Our findings indicate areas of concern with respect to access to quality maternity care in rural Pennsylvania that policy makers should take into consideration going forward. We also offer suggestions in this regard. This work is funded by the Center for Rural Pennsylvania.

Property Line Disputes: Adverse Possession Versus Consentable Boundary Line

John G. Eichlin — Clarion University of Pennsylvania
Frank Shepard — Clarion University of Pennsylvania

Commonly understood methods of acquiring ownership of real estate are by contract, inheritance or devise and gift. Additional methods, and perhaps not so commonly understood, are by adverse possession and consentable boundary line. These later two methods will be herein defined, compared and contrasted. The emergence of consentable boundary lines as a more common legal remedy for acquiring ownership of property, will also be illustrated, and explored in light of recent Pennsylvania Appellate Court decisions.

Staff Perceptions of LGBTQ+ Resident Needs in Nursing Facilities

Natalie Dick — Slippery Rock University of Pennsylvania
Jana Asher — Slippery Rock University of Pennsylvania

The importance of LGBTQ+ concerns in long-term care are well-documented. In a seminal study, the American Association of Retired Persons (AARP) (2018) found that many elders worry about discrimination in long-term care. In addition, 88% of survey respondents said they would feel more comfortable in long term care settings if caregivers were trained specifically on the needs of LGBTQ+ persons. While the need for a competent workforce has been established, the question of whether long-term care staff are prepared to care for LGBTQ+ residents remain unanswered. This study seeks to address this gap in the literature by identifying long-term care staff experiences with and perceptions of LGBTQ+ resident needs through the development of a survey instrument and analysis of survey results.

Session 26: Willow Room 10:30 am – 11:30 am

MANAGEMENT

Session Chair: *Qiongyao Zhang, Robert Morris University*

Understanding Millennials Regarding Online Versus in Store Grocery Shopping Preferences

Timothy L. Schauer — University of Lynchburg

Grocery shopping has changed in significant ways over the last 150 years. For example, 100 years ago, service counters gave way to grocery aisles and shopping baskets (not yet with wheels) – all with the goal of allowing customers to choose their own items (Strasser, 1989). Within the last decade, large U.S. supermarkets, like Kroger, Walmart, and Safeway have rolled out online stores (Perez, 2015). However, in 2017, when the Internet-based giant, Amazon, acquired Whole Foods and developed the Amazon Go concept store, the march toward online only sales came into question. The purpose of this research is to attempt to understand the preferences associated with Millennials regarding online versus instore grocery shopping preferences. This paper provides the following contributions. First, it extends research on grocery shopper preferences regarding online and in-store environments. Second, the findings provide a deeper understanding into the mindset of individuals that are currently utilizing online and in-store purchasing channels. Finally, it provides initial evidence on the relative importance of online and in-store characteristics.

The Determinants and Evolution of Corporate Ownership Structure: Evidence from Spinoffs

Thuy Bui Slippery Rock University of Pennsylvania

This paper examines the determinants of ownership structure from a sample of corporate spinoffs. Spinoff offers an interesting empirical design to study corporate ownership because following the pro-rata distribution of shares from the new publicly traded spunoff firm to existing parent shareholders, both parent and spunoff firms have an identical ownership structure. By tracking the evolution of ownership structures over 10 years of these two sets of firms that start at the same point, I find that firms adjust their ownership structures over time to fit their firm characteristics. More specifically, larger firms with high leverage, low free cash flow, high tangibility, and low research and development expenses (R&D) tend to have lower managerial ownership. Larger firms with low leverage often have higher level of institutional ownership.

Does A Private School Education Have Premiums in the Corporate Executive Labor Market Evidence from Fortune 500 Chief Executive Officers CEOs

Qiongyao Zhang Robert Morris University

This paper examines whether a private-school education has premiums over a public- school education in the US corporate executive labor market. It is hypothesized that private colleges and universities provide greater opportunities for moral development and networking for future business leaders than their public counterparts. Superior networking and higher ethical standards are rewarded in the executive labor market. Thus, CEOs who received education at a private institute will obtain more compensation than CEOs who were educated at a public institute. The empirical results suggest that Fortune 500 CEOs with a private education receive a compensation premium. In addition, Fortune 500 companies managed by privately educated CEOs generate better financial results and issue fewer accounting restatements.

Session 27: Holmes / Foster 10:30 am – 11:30 am

SUPPLY CHAIN / CRYPTOCURRENCY

Session Chair: *Azene Zenebe, Bowie State University*

Examine the National Innovation and Imitation Behaviors on Sedan Sales with Socioeconomic and Culture Characteristics

Gary Chao Kutztown University of Pennsylvania

Application of the product diffusion pattern learned from the home market could help a business to foresee the spread of a new product throughout the life cycle in another countries. However, it is not a smart idea to copy the same diffusion pattern to other countries directly. The diffusion pattern needs to be articulated and customized based on each country unique characteristics. We employ Bass diffusion model to find the national innovation and imitation behaviors based on more than 30+ annual sedan sales for 23 countries. We find the national innovation is negatively proportional to national imitation among countries. We try to decrypt the national innovation and imitation based on the variables in the Global Enabling Trade Report, the Global Competitiveness Report and Hofstede's dimensions of culture. We find infrastructure, marketing efficiency, financial market, transport service, and indulgence could depict national innovation and imitation with statistical significance.

An Integrated Architecture Framework for eGovernment Implementation in the Gambia

Abdou Karim Jallow — Slippery Rock University of Pennsylvania
Yuchen Zhang — Slippery Rock University of Pennsylvania

The public service operations in The Gambia rely heavily on the use of manual processes and laborious paperwork, which creates inefficiencies and ineffectiveness of government service delivery. The use of e-Government tools has emerged as a solution. An e- Government program was initiated to ensure government agencies to be wholly connected and integrated for online service delivery through a secure seamless and comprehensive e-Government interface. However, despite early efforts, the implementation of the e-government has been challenging. A known factor for this is the lack of a well-defined and overarching integrated implementation framework. The aim of this research was to investigate and develop an integrated framework as a guide for e-Government implementation. Qualitative research methods were used to collect data. Initially, a three- day workshop was held, which was followed by semi-structured interviews and questionnaires. Thematic analysis was used to analyze the data. Based on the results, an integrated framework was developed around three critical factors, namely: policies, technological and organizational. A validation of the framework was carried out, which indicated that it encompasses the required elements, and if followed will serve as useful guide for successful e-Government implementation. The research highlights the implications of the context for the design and implementation of e-government in developing economies. It will contribute to knowledge to both academia, industry, and government in enterprise architecture, and e-government design and implementation. The research will also provide an opportunity to investigate the applicability of tools such as case management, process automation, service-oriented computing and blockchain in e- government.

Infusion of Data Science and Analytics in Undergraduate Education and Research

Latanya Brown-Robertson — Bowie State University
Azene Zenebe — Bowie State University
Tyesha Nicole Burks — Bowie State University
Augustin Ntembe — Bowie State University

Big data and analytics are becoming ubiquitous, as a result, more and more employers are requiring graduates to have foundational knowledge and skills in the application of data science and analytics (DSA) method, process, techniques and tools. Many disciplines such as economics, chemistry, biology, psychology, and health sciences are highly data driven. Thus, infusing data science and analytics contents into these disciplines will provide students with the skills and knowledge to collect, extract, clean, integrate and analyze complex data and provide solutions to discipline-specific problems. The paper presents the outcomes of the research that include a multidisciplinary and competence-based Data Science and Analytics Infusion Framework, outcomes of development of modules and outcomes of the delivery of modules and their assessments in several undergraduate courses across the campus, outcomes from engaging undergraduate students in DSA research, and outcomes from the activities of DSA faculty learning community (FLC).

Session 28: Sylvan Room 1:00 pm – 2:00 pm

TECHNOLOGY / ECONOMICS

Session Chair: *Abhishek Tripathi, The College of New Jersey*

Cultural Heritage Institutions after Covid19: from Digitization to Digitalization

Gerard Martorell — Lock Haven University of Pennsylvania

This is a case study research of different cultural heritage institutions around the world observing their transformation from digitization to digitalization. When Covid hit, cultural heritage institutions were forced to use digital tools to continue working and offering their services. This is called digitization. But the pandemic has changed the paradigm of cultural consumption. The cultural heritage institutions are now thinking about the need to leap into the digitalization realm. In order words, to transform, to embrace the ability of digital technology to stablish new trends and propose their service in the new environment. The aim of this manuscript is to highlight how this evolution is been carried out at different Cultural Heritage Organizations of different typologies. The methodology has been exploratory, using in-depth interviews at a few institutions on three continents. The structure of the comparison is based on presenting each one of them; identifying the pre-pandemic degree of used technology by each institution; explaining the changes introduced during the pandemic, and what are the post-pandemic evolution they are aiming at.

Yelp Recommendation Algorithm Using PAM Clustering of Restaurants

Abhishek Tripathi — The College of New Jersey
Vianna Fagel — The College of New Jersey
Michell Lin — The College of New Jersey
Krishnakumar Divakaran — The College of New Jersey
Stayton Ely — The College of New Jersey
Lamont Rouse — The College of New Jersey
Satish m. Srinivasan — Penn State University

In a world where technological advancements and big data are expanding at a tremendous rate, it is essential for businesses to consider how to embrace all that they have to offer. User-Generated Media (UGM) provides industries with a wealth of User-Generated Content (UGC), and equipped with machine learning algorithms, UGC helps companies make informed business decisions. The ability to predict and assist a user's restaurant selection based on the individual's past likes/dislikes would be of great interest to the user community and business establishments. If the predictions are computed based on the various categories of a business, it would be even more attractive to the community. This paper presented an algorithm using the business, reviews, and user datasets from Yelp. We adopted Partitioning Around Medoid (PAM) clustering, a cluster analysis, on the features present in these datasets to cluster the restaurants with similar features, identify the cluster in which a user expresses a high affinity, and finally suggest a restaurant for the user which he/she has never been to or rated before.

Exempting Agents from Any Burden Sharing: A Lab-Experimental Study on The Distribution of a Monetary Loss

Wulf Gaertner — University of Osnabrueck
Yi Li — Slippery Rock University of Pennsylvania

We present findings of an experimental study of negotiations over the share of a monetary loss. Groups of four agents with differing initial endowments must unanimously agree on the contribution that each member is expected to make so that a financial loss imposed on the group is covered. Two types of proposals are of particular interest: Either the agent with the lowest endowment or the agents with the lowest and second lowest endowment are to be exempted from any monetary contribution. We find that exempting at least one agent from any loss arises in more than 60 percent of all proposals. We consider two different treatments in case of no agreement among the group members. We relate these treatments to a third type of proposal that we call "other exemptions" and discuss our findings there particularly under the aspect of gender difference.

Session 29: Willow Room 1:00 pm – 2:00 pm

FINANCE / ECONOMICS

Session Chair: *So-Jin Yu, State University of New York at Fredonia*

Role of Blockchain-Based Smart Contracts in NGO Accountability: A Case Study of Social Impact Bonds in Korea

So-Jin Yu — State University of New York at Fredonia
Jae-hoon Kwak — Pan-Impact Korea LLC.

We explore how and why social impact bonds (SIB) can help the service providers, and non-governmental organizations (NGO), strengthen upward accountability and improve their performance by considering Korea's first SIB project in Seoul from 2018 to 2020. The first Seoul SIB is a pay-for- success contract to improve social problems such as educational development for children with borderline intellectual functioning. Private investors have supported the SIB project for years, while it was supposed to be a social welfare initiative operated by the government. The Seoul Metropolitan Government pays out the principal amount and interest upon project success, effectively becoming an outcome-based finance provider. An NGO service provider, provides beneficiaries with educational development services. Independent evaluators assesses whether both the intellectual function and sociality of children with BIF improves, meeting or exceeding the intended target. An intermediary organization is a communication channel among these participants and operates the SIB project smoothly. We find that the service provider could strengthen upward accountability in the following ways. For upward accountability, the service provider delegates its responsibility around smooth and transparent operation to the intermediary organization, preferring to focus on delivering better services to beneficiaries directly. Further, block-chain based smart contracts initiated by the intermediary could enhance transparency, liquidity, and simplicity of information and ownership transfer among investors, and among all participants. We believe that the intermediary organization plays a pivotal role in improving the service provider's performance and accountability by assisting it in taking full responsibility for investors.

Analysis of COVID-19 Cases by Economic Health Education and Race Indicators of Communities

Azene Zenebe — Bowie State University
Nega Lakew — Bowie State University
Latanya Brown-Robertson — Bowie State University

COVID-19 has been sweeping our globe. To keep track of all tests, positive cases, hospitalizations, and casualties, researchers use data repository to collect, manage, and store data sets for data analytics. This research tries to find out how Covid-19 is affecting communities by their economic status as measured by household income, poverty status, economic vulnerability level, race, and other economic and health indicators. The working hypotheses are that the communities with majority people of color are more likely to have prominent cases of Covid-19 because of a high poverty rate, lack of education, and a high number of people without health insurance. The research used the Cross Industry Standard Process for Data Mining (CRISP-DM) methodology to gather, clean, and integrate data from several sources, and then assess, design, and develop interactive data analytic results in dashboard on public cloud. The analytics results reveal that the hypotheses are supported. Furthermore, a predicative model for extent of COVID-19 cases in a community is developed using machine learning techniques.

Session 30: Holmes / Foster 1:00 pm – 2:00 pm

SPORTS MANAGEMENT / MANAGEMENT / DISRUPTIONS

Session Chair: *Ronald Dick, Duquesne University*

The Effects of COVID on the Attendance of Pittsburgh Pirates Ticket Holders Prior to the Home Opener 2021

Ronald Dick — Duquesne University
Natalie Dick — Slippery Rock University of Pennsylvania

This study examines consumer perceptions of COVID-19 mitigating factors and MLB ballpark attendance, based on a survey of 300 fans in March 2021. Survey results indicate preferences related to prevention methods such as temperature checks at entrance, mask requirements, hand sanitizing stations. These preferences, in addition to COVID-19 vaccine status, gender and age were compared to home-game attendance intentions and ticket pricing preferences. Analysis of survey data elucidated key concerns related to COVID-19 exposure by age and gender. The results of this study demonstrate important factors for marketing of MLB home games during a public health crisis, such as the COVID- 19 pandemic.

A Longitudinal Exploration of our Definition of Leadership

Patrick M Mulvihill — Point Park University
Dennis Frketich — Indiana University of Pennsylvania

The purpose of our longitudinal study is to illuminate the definition of leadership as understood by degree seeking students enrolled in undergraduate and graduate programs within institutions of higher education as well as professionals within industry. To date, our ongoing analysis is demonstrating that individuals, when asked, root their definitions within characteristics or formal roles rather than illuminating the relationship between leaders and followers that underpins much of the seminal work related to leadership theory (Cox, 2017; Johns & Moser, 1989; Senge, 2005).The researchers agree with the literature that demonstrates a correlation between a set of characteristics, when present, often results in great leadership. Absent from

participant responses are two key ideas. The first, the realization that we have shifted our leadership paradigms away from relationship-based models. Secondly, the idea that the intensity of these characteristics is directly correlated to the strength of the relationships of the individuals involved. These findings will play a key role as many organizations seek to find a way forward amid an incredibly dynamic global marketplace. The vision for this session will be to present the emerging trends from data collected over the last four years, and to welcome insight into how we as practitioners within each of our respective disciplines can integrated the findings into our curriculum.

Student Adjustment in Remote Learning during Covid19

Abhishek Tripathi — The College of New Jersey
Sunita Ahlawat — The College of New Jersey

The Covid-19 pandemic has changed the educational experience of millions of students, perhaps permanently. Schools and Colleges worldwide were shut down and had to shift to a remote learning mode quickly. This unplanned, rapid move to online learning has changed both students' and teachers' education and work lives. Although the concept of online education is around for quite a long time and most educational institutes have the well-placed infrastructure to impart a good quality online education, the Covid-19 pandemic forced to switch the entire institutional infrastructure online overnight. The previous research about whether academic institutions have the IT infrastructure to support a quality online education or whether students may adopt the online educational environment may not have the same implications as suggested in the past research. The unique challenge posed by the Covid-19 on the way online education is delivered warrants research to understand various factors to assess how well students are adjusting to the remote learning environment. Based on the preliminary literature review, there are no existing scales for measuring students' adjustment that they experience when present in an online learning environment in the context of pandemic outbreak. This research attempts to fill that gap and enhance our understanding of the students' adjustment by first developing a valid and reliable measure and measuring undergraduate students' perceived adjustment.

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