HIGH SCHOOL EDITION
Journal of Student Research
Volume 11 Issue 1 (2022)

COVID-19 Business Impact Review

Allison Clark[1]

[1]Boerne High School

ABSTRACT

The coronavirus pandemic, or COVID-19, is an expeditiously developing virus advancing post-haste to all geographical regions of the world. This pandemic, caused by the SARS-CoV-2 virus, has and continues to result in negative economic and societal impacts in all aspects of human culture. However, previous studies have focused solely on the aforementioned societal implications of COVID-19 and neglecting that of the economy, specifically in regards to a business setting [3,6,7,8]. How does this impact vary among businesses, and what is the extent of negative or positive repercussions? This paper aims to address this gap by analyzing the degree of impact caused by COVID-19 on 50 various sizes and types of businesses in a small town atmosphere. A statistical analysis was performed in regards to this surveyed data, analyzing how the size and/or industry of a business plays a role in such business' response to negative uncontrollable economic events. These graphs were further grouped and findings were summarized. The study discovered a higher negative correlation between small sized service industry businesses, compared to substantially larger positive responses from medium merchandising businesses. Moreover, a new understanding was found regarding the similarity between size and industry of businesses in regards to their impact by COVID-19. Overall, this study provides insights into which businesses are potentially more vulnerable to future unforeseen detrimental situations. The findings aid in the application of a response program to be used by businesses to further mitigate undesirable outcomes of businesses caused by negative external events.

I. Introduction

The coronavirus pandemic, or COVID-19, is a rapidly growing virus affecting all geographical sectors of the world and has resulted in significant societal and economic impacts since the news coverage of the first official case in Wuhan China, early December of 2019. Although a variety of different lenses can be used to observe the implications regarding COVID-19, this study aims to quantitatively and qualitatively analyze one such lens in particular - the economic effects of COVID-19. While the novelty of the virus has not allowed for much properly conducted research, what little information has been drawn is vast in regards to the health and societal aspects of the pandemic- specifically symptoms, causes, and how to alleviate the effects of COVID-19 on a person's health when contracted-which will be discussed more in SECTION II, Literature Review. Miniscule research and data have been gathered on COVID-19 in terms of economic stability, and even less has been done to analyze/correlate the effects of the pandemic on businesses. This leads to the question, how did COVID-19 affect the economic welfare of various industries and sizes of businesses in the Boerne, Texas area during March 2020 to early January 2021? Boerne, Texas was chosen as a specified geographical region due to its small-town atmosphere and plethora of different industries of both small and large businesses, which will prove beneficial in collecting proper data regarding the effects of COVID-19 on businesses without isolating or restricting a particular type of businesses over another. Utilizing a survey-based method involving business correlative analytics, this research will anatomize all effects of COVID-19, not disregarding possible positive outcomes, between March 2020 to December 2020, also encompassing data prior to the advent of COVID-19 in order to better correlate the overall effects of COVID-19 on business economic stability.

Collected data will be categorized by 2 sets of criteria - business size in terms of employee numbers, and business industry - and compared with each other to correlate the impact level and specific effects of COVID-19

between similar sizes and industries of businesses, along with that of different or opposite specifications. The results of this evaluation potentially hold revelations of how businesses in the future could better respond to negative uncontrollable events, such as a pandemic or natural disaster, in order to mitigate the magnitude of negative responses to such events regarding business' financial fragility. Therefore, beyond these industry specific ramifications, this study also adopts a methodology that can be applied to analyze other negative or positive economic events within society.

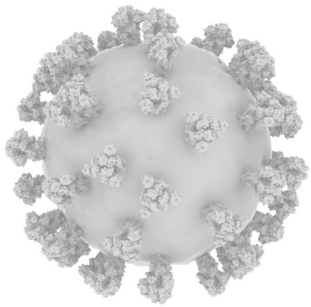

Figure 1. SARS-CoV-2 virus Illustration of SARS-CoV-2, the virus behind the COVID-19 pandemic [7].

II. Literature Review

Introduction

For the purpose of this study, COVID-19 was selected for analysis due to a variety of attributes it possesses, most notably its novelty and high relevance in current society. To begin, COVID-19 consists of a continuously fluctuating definition that alters with the revelation of new information that can be applied to the transmission dynamics of the virus that causes the overall COVID-19 disease, SARS-COV-2, or severe acute respiratory syndrome coronavirus-2 [7]. A basic definition of COVID-19 that can be applied to most scenarios referencing the disease is, as stated by the national cancer institute [8], a federal agency tasked with preventing and warning about a variety of types of cancers, "A highly contagious respiratory disease caused by the SARS-CoV-2 virus". This differs from a typical coronavirus, which in a broad sense, refers to a general reference to a family of viruses, most of which are known to infect people. A coronavirus acquires its name from the crown-shaped spikes protruding from the virus when placed under a microscope, as pictured in figure 1. According to Kathy Katella, senior clinical writer for Yale Medicine and specialist in health and medicine [6], there has been no reported outbreak of a virus that can be categorized as a coronavirus since 2003. Therefore, COVID-19 is a relatively new topic in a sense of diseases within the confines of recent advancements in technology and science-based research since the early 2000's, and my sources will mostly be drawn from papers written within a recent scope, specifically within the confines of the COVID-19.[1]

Beyond the novelty of COVID-19, another attribute it possesses that makes it extremely attractive as a subject for this research is the overall diversity of the virus, along with its indiscriminate nature. While some diseases are known to affect only a specific gender or age of persons, or result in a specific, categorizable classification of symptoms, COVID-19 does not assume this mold, as it does not fit into this stigma. According to the Center for Disease Control and Prevention, or the CDC, [3] a leader on scientific knowledge regarding COVID-19, the disease is no more likely to spread to one group of people more so than another. This social stigma, caused by fear of the unknown, does not properly relay the immense diversity of the disease, which will be examined in SECTION Ⅰ V, Results and Data Analysis. The diversity and substantial impact area was an important consideration when selecting the focus of this

1 The World Health Organization officially declared the coronavirus outbreak a global pandemic on March 11, 2020, and has no end date as of the time being.

study, as it allowed the researcher to analyze and draw correlations between a larger, more adequate scale of affected areas and groups. I will be narrowing this data down to analyze and determine a conclusion as to the effects of COVID-19 specifically related to businesses[2] in the Boerne, Texas area.

Natural Disasters

The novelty and diversity of the pandemic means that the analysis of the effects of COVID-19 in regards to a business's economy offers insights and conclusions on other such natural phenomena and their respective effects on businesses through a historical lens. According to Mihoko Sakurai, member of the Center for Global Communications and professor at the University of Japan, and Hameed Chughtai, graduate of Southampton Business School, University of Southampton [10], a strong correlation can be drawn between pandemics and natural disasters in terms of their social and organizational disruption. A coordination between their respective levels of resilience post-disaster can also be analyzed. Exampled by the Great East Japan Earthquake of 2011[3], many similarities arise between natural disasters and COVID-19; the most important being not solely negative effects on a society's economic status, but resiliency and adaptability to these events. When attempts were made after the Japan earthquake to return society to a pre-disaster status, the integration of old methods in an attempt at a pre-disaster status proved to no avail, and it was only by resilience and adaptation to the crisis that mitigation of these disastrous consequences was truly perceived. Sakurai and Chughtai relate this similarly to COVID-19, stating, "Both mitigation of the short-term impact and long-term intervention are necessary to maintain social functions and begin a transition to smooth recovery".

However, this recovery will not come about until the initial effects of the disaster are analyzed and interpreted. While businesses vary in the geographical and economic fields in which they serve, Yang Zhang, an Assistant Professor at the Urban Affairs and Planning Program, Virginia Tech University, United States [12], developed a cynical mode to infer business vulnerability from natural disasters. In concurrence with Sakurai and Chughtai's analysis of the Great East Japan Earthquake of 2011, Zhang's model is based on a business's level of capital and their business size, labor, and supplier and consumer vulnerability. This method allows the conceptualization of changes in a businesses production, sales, profits, and therefore its resilience to these effects. No matter what numbers are inputted in place of these variable holders, the outcome will always result in an overall negative impact on businesses compared to pre-disaster levels. This presents a limitation however, as it leaves no room for the possibility of a business to prosper, limiting the accuracy of the results by placing a strong bias in the collection and analysis of the data. Zhang's inference of the harmful outcomes faced by businesses after a negative uncontrollable event in terms of natural disasters, while limited in its results, can be applied in the context of COVID-19 to better understand the economic strain faced by businesses during the pandemic..

COVID-19 and business economic welfare

While there has been much research on the effects of natural disasters and their related effects on businesses and the economy [10-12], few researchers have taken COVID-19 and its coinciding effects on similar issues into consideration. According to Zhang [12], disaster research in the past, and that continued presently, focuses disproportionately on the analysis of societal effects of a disaster, such as those within familial units and community resilience levels, as opposed to business development and economic stability, which is especially true in context of COVID-19. With the present relevancy of COVID-19, the novelty of the pandemic outbreak highly limits the rate at which this advancement in information can occur, resulting in a lack of proper studies within an acceptable amount of time and constituting unbiased opinions. Most academic sources have sought to investigate the driving causes behind the SARS-COV-2 virus itself [3,6,7,8], and its effects in terms of human-based research. Such research, although valuable, utilizes a more traditional, humanity-based approach and serves to bolster the understanding of the COVID-19 virus as

2 I will not be limiting myself in terms of business variety, as I will examine a large range of businesses within the Boerne, Texas area, such as businesses in the food industry, retail industry, and other such forms of businesses.

3 On March 11, 2011, a 9.0 magnitude earthquake shocked Japan, flooding more than 200 square miles of the east coastal region, causing $300billion worth of damage, injuring 6,167 people, and killing 15, 897 in the process.

a whole. This paper will analyze existing research, along with the findings from my own study, in order to analyze and quantify the effects of COVID-19 on business activity and economic welfare.

In a study by Mark Davis, a newspaper editor for many highly respected newspapers such as The New York Times, who has received a master's degree in business and economics from New York University [4], the application of an economic lens to the topic of COVID-19 is explored, along with the analysis of pre-COVID aspects of society and the overall US economy. Davis dispels the common misconception of consumer spending allotting to 100% of the United State's economic GDP and shows that in 2018, before the economically draining effects of COVID-19, consumer spending represented 70% of the US GDP, with consumer expenditures as high as $14.5. Davis continues by probing into the economic welfare of individual businesses, finding that the average American took home $78,635 as their household income. In concurrence with Davis' data, Erin Duffin, expert in the field of economic inflation [5], proposes that the change in inflation rates[4] from 2017 to 2018 (the same time period Davis' study covered) was minimal, with only a 0.30% alteration, varying from 2.14% in 217 to 2.44% in 2018. However, the change was more evident and drastic from 2019 to 2020. With the advent of the novel coronavirus, 2020 has proved a highly capricious year, evident by the extremely high inflation change from 1.81% in 2019 to 0.62% in 2020, with statistics rivaling that of the Great Depression of the 1930's[5]. In addition to the large inflation decline, which shows poor economic stability and weakness within the framework of society, the unemployment rate in the US due to COVID-19 communicated an even more dire outcome. Dominick Rushe, US business editor for The Guardian newspaper and member of a team who won the 2014 Pulitzer Prize for public service journalism [5], in conjunction with the other articles, states that by the early July time frame, 31.8 million people claimed unemployment benefits in one week. This relays a change in governmental filings for unemployment benefits (from a low 3.6% in 2019, to 11.2% in 2020). This poses the question whether this congressional change will become a short or long term effect of the pandemic. Rushe proposed the latter side of this idea, referencing the drop in the US GDP of 32.9%, the largest quarterly drop since the Great Depression. This study intends to focus more on the economic aspect of COVID-19, similar to the welfare adaptability identified in Davis' work, in a predominantly quantitative and partly qualitative aspect.

Local effects of COVID-19 (Gap)

There are no current studies that analyze these variables in terms of the effects of COVID-19 on businesses on a local scale in the Boerne, Texas area. With the novelty and wide diversity of COVID-19, academic sources seem to be more concerned with the scientific facet of the virus itself rather than the effects of the virus, expressly those within the economical confines of society. This can be further specified in terms of the economic feasibility restraints of a smaller community, such as that of Boerne. Drawing from a survey of over 5,800 small businesses on a global scale, Bartik, et al., of the Department of Economics at Harvard University [2], found that the underlying fragility of said businesses resulted in large amounts of chaotic dislocation. As of late March, 2020, close to the inception of COVID-19 in the United States, 43% of small businesses were forced to submit to unnecessary closure due to a loss of income from the lockdowns incited by the pandemic. Temporary or prolonged closures of small businesses due to COVID-19 reached a high of a universal 70% in May of 2020. This survey conducting technique should prove useful in terms of my own research in the Boerne area, as I can collect a mixture of qualitative and quantitative data to better analyse and correlate similarities and differences among businesses, specifically in terms of their industry and size. Further itemizing this data in regards to the geographical region of central Texas, as opposed to the generality of the previous paragraph, this paper will focus on the uniqueness of a small town in the Hill Country and the impact this town received during COVID-19. This data will be collected and explored to draw correlative analyses in SECTION IV, results and data analysis.

Boerne, Texas consists of a small town atmosphere centered around bijou retail and restaurant industry based businesses, which rely on the income of tourist contributions and expenditures. This research intends to find numerical

4 Inflation refers to a general rise in the price of goods or services in a given society over a specified amount of time.

5 The Great Depression refers to a severe worldwide economic depression that took place in the 1930's.

correlations between the economic welfare and stability of these businesses and the COVID-19 pandemic. The intersection of these two topics will be analyzed and explored in depth in terms of the Boerne, Texas area in order to create a better system for businesses of all types to better adjust to negative impacts posed by COVID-19 and to mitigate their effects on the economic security of businesses in the future.

III. Methodology

Survey

To gauge the level of impact of the COVID-19 pandemic on local businesses in the Boerne, Texas area, and, by implication, the correlation between various sizes and industries of such businesses, a mixed methods approach was taken, and a non-experimental based survey was distributed across the city of Boerne. Due to the novelty of COVID-19, there is a large gap in research regarding this data, so I conducted this study in order to explain the overall negative impacts of COVID-19 on businesses in the Boerne, Texas area. I then analyzed different variables within the businesses, such as industry type and size of the businesses by way of employee numbers and sales, and the correlations between both similar and different types of businesses. A survey, in the form of a primary approach, consisting of 15 questions was chosen as part of the methodology because it allowed for the collection of more data through the ability to reach more businesses, and allowed for the specificity of the results of the study to become more applicable to the Boerne, Texas area.

In order to increase sample size and thus have the most accurate data, the survey was sent to approximately 400 small businesses in Boerne and the surrounding area. I included the surrounding area of Boerne into my research as well due to the size limitation of the area, of which constitutes 11.98 mi^2 and an estimated population of 18,232 persons as of July 1, 2019 according to the United States Census Bureau [11]. Inputting these numbers into the REAP Locale Classification System[6] [9], Boerne is considered to be a small town, or "an incorporated place or Census-designated place with a population less than 25,000 and greater than or equal to 2,500 and located outside a metropolitan area". This placed a limitation on the research in the number of survey participants I would be able to obtain; however, this study seeks to provide findings of specific data regarding a small-town atmosphere and business setting, and research ramifications in terms of location will not be altered greatly due to the target results of the research. In addition, the survey was not directed towards a specific quarry industry or type of business and was sent to all businesses in the Boerne area by email, as this mode of virtual communication allowed for more businesses to receive and have the possibility of completing the survey.

The design of the survey was based on a study enacted by One Acadia in the Acadiana region of South Louisiana, of which constitutes the leading economic development organization in the region. In order to study the economic impact businesses endured during the COVID-19 lockdown, researchers for the company asked business participants in Southern Louisiana to describe different areas of their business impacted by COVID-19 in order to evaluate the impact level on each business. Such areas include changes in revenue, operational hours, and staff rotations. While the questions in the observed study are in regards to a specific 3 month period (April 1, 2020 to July 1, 2020) constituting the COVID-19 lockdown in which travel and business operations were highly restricted due to safety concerns, the survey conducted in this study involved some modeled questions following the areas of impact regarded in the case study. The remaining questions were inspired from those in the sample survey, leading to the final development of the remainder of the survey included in the APPENDIX Ⅰ section of the research paper. A possible limitation hindering the validity of my results includes participants' truthful nature in answering the survey questions, and an inability to prove the answers veracity. Animosity options were preserved for a non-biased study.

6 The REAP, or Rural Education Achievement Program, is a system that applies definitions of rural and urban, as defined by the US Census Bureau, to determine size classifications of cities and towns, that is then applied to other fields, specifically education and schooling.

Analysis

Once the survey data had been collected over a 2 month time period, the results were first categorized into 3 stages of economic progression; pre-COVID-19 (2018-2019 time progression), mid lockdown (March 1, 2020 to July 1, 2020), and post lockdown, of which constitutes current economic status of businesses. Most of the surveys were conducted in late 2020, so the results regarding post lockdown statistics were in regard to August through December of 2020. All stages were accounted for in reference to both qualitative and quantitative statistical questioning, allowing for a deeper understanding of the effects of COVID-19 on the business economy of private owned, small businesses.

The survey participants were then separated into groups depending on the size of their business. Due to the small-town nature of Boerne, in the survey used in this paper small businesses constitute 5 or less employees, medium businesses 6 to 15, and large businesses employing 16 or more employees over a consistent basis. This size-based domain was then compared to a similar categorization of businesses in terms of industry/type of business, such as retail, food, entertainment, etc. A correlative analysis was applied to the comparison between the size and industry of all businesses surveyed, resulting in the final stage of categorized results. The results were then compared and contrasted through a correlational approach to better grasp the intensity of impact the COVID-19 pandemic has had on various businesses, both in a positive and negative aspect.

A statistical analysis was applied to the gathered data in terms of a correlation analysis[7]. Nine such analyses were performed: four regarding a business' impact level during COVID-19 as variable X, with the number of businesses of a certain size as the variable Y in accordance with their respective impact levels, and 5 additional graphs with the same variable X, but a variable Y of the number of businesses of a specific industry in a similar fashion as the previous model. Variable Y for the analyses, constituting the dependent variable, was in regards to a question asked in my COVID-19 Business Impact Survey phrased as follows: "Has COVID-19 had an overall negative or positive effect on your business?" Answer choices included very positive, positive, neutral, negative, and very negative. I input each business' answer to this question and their size in regard to a previous question, and analyzed the results in terms of a bar graph without business names to better allow for unbiased results. The same method was applied to Analysis Model ＩＩ, substituting size for industry for variable Y, which will represent the independent variable again, allowing for the same dependent variable as Analysis Model Ⅰ. As opposed to separating each graph between 24 different types of business industries, which would result in minimally effective results due to the great size limitations that would be placed within each category, it was decided to tabulate the data regarding business industries into four classifications to allow for more accurate data. These groupings were labeled as follows; Service Industry, Merchandising Industry, Manufacturing Industry, and Hybrid Industry. These listings were chosen based off of a publication by the educational website Accounting Verse, a free site for financial accounting aid. Instead of the broad categorizations of primary, secondary, tertiary, and quaternary businesses, of which many studies rely on, the ideas of the website were chosen to better fit into the demands of my study, specifically the limited business industries gathered due to the geographical constraints of the area surveyed. A Service business can be defined as a business providing intangible products to consumers, a merchandising business as one that buys products at wholesale value, yet sells them at retail price, a manufacturing business as those that buy products with the sole intent of using them as materials in creating another product, and lastly a hybrid business that can be classified into more than one of the previous industries, such as that of a food related field [1]. Specific industries and their respective categories are represented in detail in APPENDIX ＩＩ. The data was analyzed in terms of the correlation between business size and overall impact from COVID-19, along with this impact in reference to business type in order to determine what sizes and industries of businesses were the most and least impacted by COVID-19, both in terms of positive and negative effects. The results of Analysis Ⅰ and Analysis ＩＩ were analyzed in a similar bar graph manner in regards to those least and most affected, both positively and negatively, by the pandemic in correlating commonalities and differences between the impact level of size and industry of businesses. This style of analysis was chosen to better allow for an unbiased and lucid analysis of long term trends existing between variables expressed above.

7 Correlative analysis applies to the statistical method used when comparing the strength of a relationship between two variables.

IV. Discussion/Data Analysis

Business responses collected through surveys outlined in SECTION ＩＩＩ, Methodology, demarcate the overall effects of COVID-19 on various businesses within the Boerne, Texas area. These experiences were categorized by business size and industry, then examined through a statistical analysis, of which was later allocated into nine graphical representations- four representing business size, five regarding business industry. The four graphs constituting data concerning a business' size (small, medium, large, and total), compared to their impact level due to COVID-19 are, respectively, labeled as 1, 2, 3, and 4. Similarly, the five graphs in reference to a business' industry (service, merchandising, manufacturing, hybrid, and total) compared to the same variable are represented, respectively, by 5, 6, 7, 8, 9.

Business Size

The first set of results presented, labeled as Figures 1-4, are of the business size versus impact level, as this variable allows for an ease of comparison with more even results between categories, thereby leading to a better representation by an increased uniform presentation of data to compare to that of the less consistent business industry, Figures 5-9. The graphs for both size and industry contain a similar outward structure, with the x-axis constituting a businesses impact level by COVID-19 as, in order, very positive, positive, neutral, negative, and very negative, while the y-axis shows the number of businesses, out of the 50 surveyed, who classified themselves into the given size and industry options available in the survey. Figures 1-3 depict the number of businesses within each size categorization that exhibited characteristics representing each progressive impact level of COVID-19. Figure 4 portrays similar results, but instead uses data gathered from all businesses in terms of size. As shown in Figure 1, small businesses exhibited a more neutral and negative stance on COVID-19, with 38% neutral, 41% negative, and only 21% showing a positive increase in sales and revenue. Conversely, medium sized businesses showed almost half of the participants reported experiencing an overall positive increase, with 46% positive, 27% neutral, and 27% negative. Large businesses appeared to stand their ground most consecutively, with relatively even results of 30% positive, 30% neutral, and 40% negative. As previously stated, large businesses maintained more stable results than small or medium sized businesses, while small businesses showed the most varied results. This shows little substantial impact on the overall outcome; however, both large and small businesses conveyed a more negative result than medium sized, with small businesses confronting the most negative results. This could be partly due to a lesser amount of economic stability typically held by small businesses, which in the surveyed area include mostly family-owned and community-supported organizations. These businesses were either completely shut down or highly limited in the amount of revenue they were able to take in, wrestling high levels of economic detriment on their establishments, as shown in Figure 1. The results presented in 2 and 3 portray an anomaly compared to predicted results. According to the data, medium businesses showed the most positive results and large businesses held more negative outcomes, excluding the previously mentioned effects on small businesses. Predictions were the opposite of what the data showed, in that medium sized businesses appeared to fare better in the face of COVID-19 than small or large businesses, and large businesses, which were thought to be the most economically stable, displayed, within a one percent difference, the same results in terms of specifically negative outcomes as small businesses. Possible reasons for this may be because large businesses are more limited in Boerne, and therefore contain a more varied amount of types of businesses, leading into Figures 5-9, of which compare the same impact levels as before, but instead focus on a business' industry as compared to its size.

Business Industry

The second set of results, Figures 5-9, analyze a businesses impact level due to COVID-19 with their respective industries, categorized by service, merchandising, manufacturing, and hybrid businesses. Further classifications of which surveyed businesses fit into each category are presented in APPENDIX ＩＩ. As shown in Figure 5, businesses under the service industry bracket depicted an overwhelming majority of negative responses, with 54% nega-

tive, 25% neutral, and 21% positive. These include any business that provides an intangible service for a profit, therefore demonstrating that such businesses in a small-town atmosphere, of which typically include a majority service industry-based businesses, resulted in the most negative outcome compared to other industries. This could be a result of people not wanting to or being unable to leave their house, mostly during the lockdown timeframe, and therefore a decline on the dependency of personal based services, relaying a forced "do-it-yourself" atmosphere. Conversely, merchandising businesses saw the most positive results, having 42% positive responses, with 33% neutral, and 25% negative. The results of these businesses, which provide tangible products in exchange for monetary values, show a representative pattern within society; during any economic or societal outside event, whether intensely positive or negative, there will always be a high demand for material products. While some may use this as a coping mechanism, buying unnecessary items out of habit or boredom, everyone requires essential items, such as food, water, and protection. Particularly in regards to the research presented in this paper, while it may be limited in accuracy by outside events, gun-based retail saw a monumental increase in sales, with many people unaware of the appropriate course of action due to an overwhelming fear of the unknown.

Unlike the majority of positive or negative results represented within service and merchandising industries, that of manufacturing and hybrid contained the most unbroken and/or neutral results. Manufacturing businesses, while highly limited in number, showed 0% positive responses, a bulk of 67% neutral, and 33% negative. Hybrid businesses, consisting mostly of food and drink based retail, saw 36% positive results, 36% neutral, and 28% negative. This differed from previously thought results, as it was expected that food and drink based establishments would see the most drastic decrease in sales, while the results from the Boerne area showed otherwise. While not a large increase in positive responses from that of negative, results showed eight percent more positive reports, and this could be a result of increased community involvement due to the small-town atmosphere of Boerne. I do not predict these particular results would be maintained for a larger city, however, because of more restaurants and bars coupled with less community participation. Overall, when comparing both sizes and industries of businesses, small service industry businesses endured the greatest majority of negative results due to COVID-19, while medium sized merchandising businesses experienced substantially larger positive results.

Total

Advancing from individual results, the graphs of Figures 4 and 9 represent the total number of businesses respective of each category compared to the same scale for impact. In regard to the total number of businesses by size, 28% reported a positive result, while 34% were neutral, and 38% responded with an overall negative impact due to COVID-19. Similarly, the total number of businesses in regards to industry saw 28% positive, 32% neutral, and 40% negative. As seen in the graphs, the results are the same between total size and industry, except for one variance between neutral and negative responses, with total size depicting 34% neutral and 38% negative responses, and total industry reporting 32% neutral responses and 40% negative. Therefore, between total size and industry based results, neutral responses went down by one participant and negative responses went up by one. This could be solely due to an error in miscalculations, or it could aid in uncovering an underlying major truth in the results, leading to a new understanding of the results of negative economic events within a business setting. As the variance is present in the Y-variable data, a business' size and industry are not necessarily proportional between impact levels. Two businesses of the same size and industry could have experienced differing responses to COVID-19, one being negative, one positive- and the majority of responses determines the percentages given to each impact level progression, this variance could indicate that typically, business size and industry go concurrently in determining business impact level. This means that business size and industry, when analyzed separated from one another, yield similar results.

These results portrayed in Figures 4 and 9 show that despite individual businesses classifications of size, the results showed almost the same data for business industry and vice versa. Therefore, this data, of which ultimately evens out when comparing totals, supports a new understanding in terms of business size and industry that when comparing the same number of businesses, the sizes and industries will eventually equilibrate to almost the exact same values in regards to the effects of a certain event. While the graphs do not necessarily represent the same businesses

in each category, the amount of businesses shows little difference, giving way to this new understanding. This direct relationship could be used in future research to corroborate results in regards to businesses between varying sizes and industries, showing a new way of finding the percent error in a select group of results. This relationship therefore reveals a new facet of business specifications, and shows the variables similarities, as compared to looking at size and industry separately.

V. Conclusion

This section aims to primarily discuss the research's limitations and implications, as well as potential future directions. There were some limitations to this study that future research could aim to address in order to form a better understanding of the effects of less commonly explored business variations in response to outside events, particularly why certain businesses respond more negatively or positively to specific economic events. Many of these stem from limits in more simplistic forms of comparisons between gathered data, along with surveyed time and capacity. With more advanced and specialized software, better analyses could be conducted with more specific data, allowing for less biased and more accurate results in individual business data, but also in the comparison of such data. Furthermore, size constraints on the surveyed area and thus the number of responses provided less data to analyze, relaying an amount of businesses much too small to be considered significant. There also exist limitations on a businesses size and industry's applicability in determining their impact from negative economic events. Although such qualities prove attractive to this research, as established in SECTION Ⅰ Ⅰ, the literature review, there is minimal data regarding both this topic in regards to COVID-19 and in general. The incompleteness of information concerning the surveyed businesses' individual impact from COVID-19 and quantifiable proof presents a substantial limitation in the analysis of the impact of COVID-19 on differing businesses.

The methodology utilized in this study holds its own potential. As seen in SECTION Ⅰ V, results and data analysis, the effects of COVID-19 between a business' size and industry ultimately relayed nearly equivalent values, proving that precise predictions can be made about a businesses impact level by these two variables. However, broader patterns and trends can be discovered, which hold potential for future businesses in preparing for outside disasters. As such, this method of mixed qualitative and quantitative data analysis can be further implemented for other economic events, such as natural disasters or economic depressions, even if they do not share exact similarities with COVID-19. Individual analysis is still recommended however for optimal results.

Ultimately, while individual results differed from preexisting theories, the sets of data represented in Figures 4 and 9B corroborated my hypothesis that businesses of all sizes and industries had an overall negative impact due to COVID-19. Moreover, the similarities shared between the results of total business sizes and industries prove the possibility of use in further studies.

The results of this study inspire further inquiry into the application of a response program that could be used in the future to further mitigate undesirable outcomes on businesses by negative uncontrollable events. This system could prepare businesses on how to better approach negative events based on their respective size and industry, and aid future businesses in alleviating the stress of economic fragility.

Bibliography:

[1] Accounting Verse. "Types of Businesses and Forms of Business Organizations - AccountingVerse." accountingverse.com. Accounting Verse. Accessed February 23, 2021.https://www.accountingverse.com/accounting-basics/types-of-businesses.html.

[2] Bartik, Alexander W., Marianne Bertrand, Zoe Cullen, Edward L. Glaeser, Michael Luca, and Christopher Stanton. "The Impact of COVID-19 on Small Business Outcomes and Expectations." PNAS. National Academy of Sciences, July 28, 2020. https://www.pnas.org/content/117/30/1765.

[3] Centers for Disease Control and Prevention. “Reducing Stigma.” Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, June 11, 2020. https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/reducing-stigma.html.

[4] Davis, M., 2020. *The Spending Habits Of Americans*. [online] Investopedia. Available at: <https://www.investopedia.com/financial-edge/0512/the-spending-habits-of-americans.aspx> [Accessed 14 September 2020].

[5] Duffin, Erin, and May 7. “U.S. - Projected Inflation Rate 2008-2024.” Statista, May 7, 2020.https://www.statista.com/statistics/244983/projected-inflation-rate-in-the-united-states.

[6] Katella, Kathy. “Our New COVID-19 Vocabulary-What Does It All Mean?” Yale Medicine. Yale MD, April 7, 2020. https://www.yalemedicine.org/stories/covid-19-glossary/.

[7] Lipsitch, Marc, D Phil, David L Swerdlow, and Lyn Finelli. “Defining the Epidemiology of Covid-19 - Studies Needed: NEJM.” New England Journal of Medicine, May 7, 2020. https://www.nejm.org/doi/full/10.1056/NEJMp2002125.

[8] National Cancer Institute. “NCI Dictionary of Cancer Terms.” National Cancer Institute. National Institutes of Health Dictionary, 2020.https://www.cancer.gov/publications/dictionaries/cancer-terms/def/covid-19.

[9] “REAP Locale Classifications and Criteria.” nces.ed.gov, 2019. https://nces.ed.gov/programs/edge/docs/LOCALE_CLASSIFICATIONS.pdf.

[10] Sakurai, M. and Chughtai, H., 2020. *Resilience Against Crises: COVID-19 And Lessons From Natural Disasters*. [online] Taylor & Francis. Available at: <https://www.tandfonline.com/doi/full/10.1080/0960085X.2020.1814171> [Accessed 30 September 2020].

[11] US Census Bureau. “U.S. Census Bureau QuickFacts: Boerne City, Texas.” Census Bureau QuickFacts. Accessed December 5, 2020.https://www.census.gov/quickfacts/boernecitytexas.

[12] Zhang, Y., Lindell, M. and Prater, C., 2020. *Vulnerability Of Community Businesses To Environmental Disasters*. [online] Wiley Online Library. Available at: <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1467-7717.2008.01061.x> [Accessed 14 September 2020].