

The Road to Recovery: A Study on Small Business Health in NYC during COVID-19

KEVIN ZHENG, New York University Tandon School of Engineering

JAMES NG, New York University Tandon School of Engineering

1 ABSTRACT

On many levels the COVID-19 pandemic was unexpected, causing many sweeping health and public safety policy changes. These sudden changes altered the behaviors of American consumers, leading to major economic repercussions and the suffering of small businesses across the country. New York City was one of the most negatively impacted cities by the pandemic. There are over 8 million people in New York City, over 220 thousand of whom are small business owners, while many more are small business customers [4]. This paper seeks to provide an analysis of how small businesses were impacted by COVID-19 throughout the pandemic. By analyzing various economic, geographic, and small business-specific data sets released by the government, we aim to explain how COVID-19 impacted small businesses in New York City, and how small businesses have recovered in the latter end of the pandemic. We show that the health of businesses is correlated to the public perspective of the pandemic. In the beginning, fear was high, and small businesses suffered in various measures of indication, but as public sentiment changed, along with fiscal policy changes, data showed that small businesses had made a remarkable comeback. We also show that the effects of COVID-19 have affected the city in disproportionate ways, with certain boroughs being hit harder than others. As we move further and further away from COVID-19, more small business-related data will be released by the government, and a better picture can be painted about the state of small businesses after the pandemic.

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Code Repository: https://github.com/jng9134/SBH-COVID19_Analysis

2 INTRODUCTION

The COVID-19 pandemic resulted in the sudden, widespread closing of many stores and businesses around the world. New York City was one of the cities that the virus hit the hardest due to its population density. By March 22, 2020, all non-essential workers were forced to stay home and the city that never sleeps was put to bed. When it was first announced that New York City would go into lockdown in March 2020, many businesses were forced to shut down in the coming months. With many people staying in their homes, along with the sharp decline in tourism, many economic centers that relied on large volumes of foot traffic suffered. Businesses that were able to adapt to the strict, constantly

Authors' addresses: Kevin Zheng, New York University Tandon School of Engineering, New York, kz1252@nyu.edu; James Ng, New York University Tandon School of Engineering, New York.

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changing climate of COVID-19 were able to survive, however, there were also many businesses that were not able to adapt and were, ultimately, forced to close.

It is well known that the pandemic had major economic repercussions on the city, especially for small businesses. Stores that were not closed due to policy changes were severely starved of customers due to a combination of fear, health, and safety regulations. Due to the limited up-to-date business-level data released by the government, it is often difficult to accurately study the health of small businesses. Previous research studies have used proxies to evaluate the effects of COVID-19 on small businesses. Specifically, the Current Population Survey (CPS) microdata was used to estimate active small business owners in the United States [3](Fairle, 2020). The CPS is a monthly survey of households that encapsulates the labor force, employment, unemployment, persons not in the labor force, hours of work, earnings, demographic, and other labor force characteristics, which allows for up-to-date estimates on the whereabouts of small businesses[12].

Studies using CPS have already shown that there was a 22% drop in active business owners in the United States during the first three months of the pandemic (February 2020 – April 2020) with a small 7% recovery by May 2020 [3]. Although CPS data provides a good proxy for studying small businesses in the early phases of the pandemic, it is not perfect. CPS data is collected through surveys with its main purpose to collect information on the employment situations of Americans. It is difficult to achieve accurate representations of small businesses' health due to its inconsistencies. For example, the number of individual responses on a month-by-month basis varies from tens to hundreds of thousands of people. This makes it difficult to calculate trends and get accurate statistics on the state of small businesses.

As we are still in the dawn of the post-pandemic era, studies on the exact effects COVID-19 had on small businesses and self-employed workers are incomplete. To gain a deeper understanding of COVID-19's effect on the landscape of small businesses in New York City, we offer an alternative approach. Similar to how CPS data can be used as a proxy to estimate the health of small businesses, other standardized government-released data as well as ancillary economic data sets can also be used as proxies to examine the health of small businesses.

This report will be structured as follows: a concise description of our problem statement, where we detail the questions we are attempting to tackle in this report. This will be followed by a literature review of past research papers on the effect of COVID-19 on small businesses. Then, we will present our methodologies and design, where we address the specific data we will be working with and how we chose to process them. Finally, we will present our results and finish with a discussion of our findings and possible expansions.

3 PROBLEM STATEMENT

This report aims to build upon current research on the impact of COVID-19 on small businesses. Many current studies look at the early impact of COVID-19, however, there are limited studies done on the current state of small businesses and whether the early damage caused by the pandemic has been relieved or not.

The objective of this report is to paint a larger, holistic picture of the impact COVID-19 had on small businesses in New York City throughout different stages of the pandemic by looking into various proxy measures. We aim to examine what these various indicators can reveal about the health of small businesses before, during, and after the pandemic. Additionally, we plan to investigate the factors that might have led to small business closures, how the impact of COVID-19 on small businesses might have differed across boroughs, the factors that lead to those differences, and how small businesses in NYC have recovered.

3.1 Questions We Seek to Answer:

- How has the health of small businesses been impacted throughout different points in the pandemic? We seek to investigate fluctuations in possible indicators of the stability of small businesses.
- For any major changes in the state of small businesses, are there specific reasons that can explain those changes? Were some boroughs impacted more than others? Was the impact short-term or long-term?
- With COVID-19 in the rear-view mirror, what is the future outlook of small businesses in NYC? Will they continue to struggle, or are they back to a pre-pandemic levels?

4 RELATED WORK

Literature detailing the early impacts of COVID-19 spans a large variety of socioeconomic topics. Related work on COVID-19's impact on small businesses can be dated back to early 2020.

Early writings regarding the impact of COVID-19 primarily discuss the initial reactions and expectations of small businesses. For example, in an independent survey conducted on more than 5,800 small businesses at the start of the pandemic, it was found that nearly 54% of firms (located in the Mid-Atlantic Region incl. NYC) were closed as a result of disruptions caused by COVID-19 [2]. The paper also states that small businesses across all industries reduced active employment. In addition, Bartik et al. [2020] show that many business owners were not optimistic about their ability to remain open through the pandemic, with nearly three-quarters of respondents claiming that they only had enough cash to last two months or less. As a result, a majority of the businesses surveyed also planned to participate in government-sponsored relief funding. Lastly, more than 80% of business owners believed that the COVID-19 crisis would end in Q4 of 2020. As we now know in the present day, the pandemic lasted far longer than many had anticipated.

Early analysis work on the impact of COVID-19 on small businesses was also conducted. Papers by Robert Fairlie [2020] emphasize and demonstrate the usage of CPS microdata as a means of estimating the impacts on small businesses throughout the United States. Preliminary studies from Fairlie provide evidence that the early-stage impact of COVID-19 resulted in a drop of 3.3 million active small business owners across the United States [3]. As the analysis conducted by Fairlie uses data from very early on in the pandemic, he does not state whether these closures are permanent. We also choose to not use CPS data in our analysis primarily due to its nature as a survey. It is difficult to accurately judge trends in the number of small businesses with CPS data as the number of survey responses changes in drastic magnitudes from month to month.

Reports written in the post-pandemic era serve to provide a more detailed analysis of the lingering effects of COVID-19 on the health of small businesses. In 2022, the official New York City comptroller released a report spotlighting the pandemic's effect on the city's business sector. Utilizing data from the Quarterly Census of Employment and Wages (QCEW), it was found that New York City had lost more than 4000 private establishments from 2019 to 2021, a disproportionate amount of which came in Manhattan [9]. The study also notes that this could be a part of an ongoing trend accelerated by the pandemic of private establishments moving out of Manhattan to other boroughs. Longitudinal studies on the impact of COVID-19 also reveal that small businesses have suffered disproportionately from the COVID-19 pandemic [Wang et al. 2022]. These varying differences in the perception of the impact of COVID-19 can be attributed to different health situations, public policies, as well as other socioeconomic factors. In their report, they find that states in the northeastern coast had handled the pandemic the worst out of all studied regions in terms of business operation [6]. And while these states did recover fast, they also had the worst assessments about the overall

impact of the pandemic. Drawing on the findings of these studies, we explore data in the context of the geographical location where it permits in order to see if there are factors that affect boroughs differently.

There are not many current papers specifically looking at the impact and aftermath of the COVID-19 pandemic on New York City’s small businesses. As such, we aim to expand on this topic of study by examining what external indicators show about small business health through the COVID-19 pandemic. We expand on the work of previous studies by taking into account geographical location and more current government-released data.

5 METHODS, ARCHITECTURE, AND DESIGN

5.1 Definition of Small Business

There are many different definitions of what a "small business" is. Small businesses can be defined depending on their establishment size, their total revenue, or even their ownership structures. These definitions can further change depending on the specific industries a "small business" is in [5]. It is difficult to gather information about small businesses because it is represented differently in different data sets. For the purpose of this paper, we refer to "small business" as an umbrella term that represents all of its definitions. As a result, we do not distinguish a small business of one person from a small business with a hundred people, or one with millions of dollars of revenue from one with one hundred dollars of revenue. Furthermore, we also include other classes of workers in our definition of "small business." Depending on the data set, we use classes such as private establishments and self-employed workers as proxies for estimating small businesses. Although this may not represent the true population of small businesses, we believe this methodology allows us to assess a wider set of data in order to obtain a more holistic view of small business health.

5.2 Note on Geographies of Data

This paper is primarily meant to focus on small businesses in New York City. However, some relevant government-released data that we studied are specific to the United States as a whole. In these cases, we may compare United States data to New York specific data assuming a hypothetical New York specific distribution would be similar to that of the United States.

5.3 Data Sets

(1) Quarterly Census of Employment and Wages

As data on the number of small businesses in the city is not readily available, we evaluate the impact of COVID-19 on small business health by looking at the number of private establishments in the city instead. The Quarterly Census of Employment and Wages (QCEW) program publishes a quarterly report of employment and wages from employers organized by varying levels of size and industry. Using the Data Viewer provided by the Bureau of Labor Statistics, we extracted quarterly data regarding private establishments in all five counties of New York. This data includes features detailing the total number of establishments as well as employment in a particular quarter. The QCEW data use date ranges from 2019 Q1 to 2022 Q3 for all boroughs. We use this data to visualize the total number of private establishments in each borough over the pandemic. The drawback of this approach is that we are not able to distinguish between the “small” and “large” private establishments. Thus, it might not entirely be clear if any notable change is specific only to small businesses, however, we expect small businesses to be more sensitive to any trends found.¹

¹Additional details on cleaning may be found in the code repository. There will be limited discussion on cleaning/integration here.

(2) Legally Operating Business

Another way to measure the health of small businesses is to look at how many people are opening licenses to legally operate in New York City. In fact, NYC OpenData keeps track of all DCA (Department of Consumer Affairs) Licenses since 1977. This data set provides the license creation date, expiration date, business name, industry, location, and various other information related to the business. From this data set, we extract the total number of business licenses opened and aggregate them by year and month. Additionally, we aggregate the licenses by borough/location as well as by industry. A potential drawback of this data set is that there may be many small businesses that are not necessarily legally registered. As a result, those businesses would not be captured here. We use this data set as a proxy for the health of small businesses.

(3) COVID-19 Cases By Day

An important aspect of looking for trends in small businesses during the pandemic is actually studying how the pandemic has evolved over time. If any correlation is found between COVID-19 cases and other indicators of business health, then we may hypothesize that there may be a relationship between them. Thankfully, New York City keeps track extensively of the number of COVID-19 cases. Since March 20, 2020, the city has been tracking the total number of cases daily, including the 7-day average number of cases, as well as the number of cases by borough. As the number of COVID-19 cases comes in spikes, there are periods of high rates of infection as well as periods with low rates. Taking this into account, we chose to look at the average number of cases reported in a day, in any given month. This method would still retain the same distributions of highs and lows, but scale numbers considerably so they are easier to visualize. A benefit of this data set is that the city updates the database on a regular basis, so the data is always up to date. This data set was obtained from NYC's public GitHub: <https://github.com/nychealth/coronavirus-data>

(4) Savings and Investment

In addition to seeing how activity has changed around the city, we also wanted to see how consumer expenditures might have been shaped by COVID-19. Unfortunately, spending data in NYC is not readily available. Thus, we took a different approach to evaluating consumer spending: by how much they are not spending ie. saving. To this point, we looked at the savings and investment data set taken by the U.S. Bureau of Economic Analysis (BEA) using their online interactive data tables. The specific table we are examining comes from Section 2.6 of the National Income and Product Accounts. This data set records the personal income and its disposition on a monthly basis. The table also records information about income, social security, medicare, and other personal income variations organized by month. The data set we extracted from the BEA online querying tool represents the total personal savings of millions of Americans across the United States in our time frame of interest. Although the scope of this paper is on New York City, we extrapolate that the personal savings of Americans as a whole are also representative of the personal savings of New Yorkers. Taking this into account, we visualize the total savings of Americans over time in order to identify patterns that might help to explain our questions.

- (5) **Bi-Annual Pedestrians Count** Even with the advent of online shopping, many storefronts in the city are still sustained by in-person shopping. Thus, we look to foot traffic in the city as a proxy to see how shopping volume might have been impacted during the pandemic. We used the Bi-Annual Pedestrians Count data set from NYC OpenData which tracks trends in neighborhood commercial areas to conduct our analysis. The data set keeps track of pedestrian volume by using 114 different trackers placed throughout the city. Of the 114 trackers, 100

were on-street locations in primarily retail corridors, which makes this a good indicator for our investigation. In each recording instance, data from the morning, night, and weekend is collected by each tracker. Our analysis combines the three data points into a single value representing the total volume of traffic at a certain tracker. As we wanted the data to be as accurate as possible to the real changes in foot traffic, we focused exclusively on trackers that have consistent data throughout the pandemic. Where possible, we attempted to not lose too much data by imputing values based on prior observations. Of the 114 original trackers, 86 trackers were used to gauge pedestrian volume across the five boroughs. Of these trackers, 28 were in Manhattan, 22 in Brooklyn, 24 in Queens, 8 in The Bronx, and 4 in Staten Island. We then use this data to plot the pedestrian volume over time and generate some statistical insights.

(6) Paycheck Protection Program

In order to evaluate varying economic impacts on small businesses in NYC, we wanted to look at possible differences in expenses paid by businesses ranging from size to location. To achieve this, we looked at a data set with loan data from the Paycheck Protection Program (PPP). The PPP was a program established by the CARES Act and implemented by the Small Business Administration. It provided small businesses with funding for up to eight weeks of payroll as well as other expenses such as mortgage interest, rent, and utilities. We use this data to chart the expenses of businesses of different sizes (evaluated by the number of jobs reported). We chose to look at loans with 100 or fewer reported jobs. We then split these into ranges of 1,2, 3-5, 6-10, 11-20, 21-50, and 51-10 buckets to generate statistics grouped by borough. In our analysis of loans from the PPP program, we looked exclusively at loans from the first draw whose terms were 24 or 60 weeks. This is to ensure fairness in our comparison of loans taken out.

(7) Federal Funds Rate

Interest rates play a major role in the economy, and more importantly, in small businesses' ability to thrive. Higher interest rates indicate that it will be more expensive for businesses to borrow money to finance their business, which leads to higher operating costs and lower profits. The opposite can be said for low-interest rates. The Federal Open Market Committee (FOMC) meets eight times a year to determine the federal fund's target rate. As previously stated, this rate influences the effective federal funds rate through open market operations or by buying and selling of government bonds. Due to the nature of the pandemic and its detrimental impact on the economy of the United States, federal funds rates were cut at the start of the pandemic for a period of time. The interest rate hence reflects the FOMC's evaluation of the economy throughout the pandemic. By observing how the interest rate has changed over time, we are simultaneously able to see when the committee deemed the economy was healthy enough from the pandemic lows. The data set we will be examining is the Federal Reserve Economic Data (FRED). This data set contains frequently updated US macro and regional economic time series at annual, quarterly, monthly, weekly, and daily frequencies. The specific data we are looking at is the Federal Funds Effective Rate over time. The data is recorded on a monthly frequency.

6 RESULTS

6.1 Small Business Health

We start by looking at possible trends in the health of small businesses throughout the pandemic. To achieve this, we look at two variables that correlate most with the health of small businesses: the number of private establishments in the city and the number of business licenses being created. Throughout numerous data sets, we see a similar pattern whereby COVID-19 had a sudden, negative impact on small businesses, followed by an incredibly sharp recovery. The impact of COVID-19 can be considered relatively short term as small businesses appear to have recovered by the end of 2020. One thing to note is that not all changes were because of the pandemic, but in fact, the pandemic may have also accelerated *already existing* trends in New York City.

6.1.1 QCEW.

As the number of private establishments varies drastically from borough to borough, we instead chart the percentage change in the number of private establishments from Q4 2019 over time (Figure. 1). When visualized in this manner, we observe similar trends across all boroughs in certain time frames. In Q2 2020, when the city first went into lockdown, there was an apparent dip in private establishments. While the numbers appear to recover across all boroughs throughout 2020 (with the exception of Manhattan), 2021 is when the number of private establishments seemed to get hit the hardest.

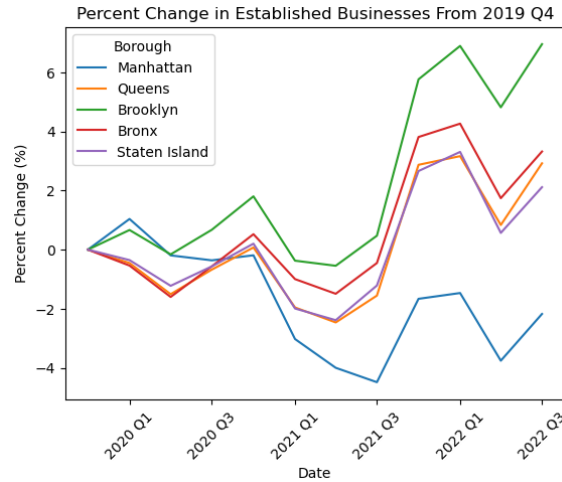


Fig. 1. Percent Change in Private Establishments from 2019 Q4

In our analysis, we also chose to look at two specific points in time for comparison: one mid-pandemic, and one representing modern day. At the point in time this report was written, QCEW data for NYC existed only up to Q3 2022. Thus, we use Q3 2022 as the closest approximation for the present day. In our findings, Manhattan was struck the hardest in the middle of the pandemic, losing upwards of 5,774 private establishments at a nearly 4.5% loss compared to pre-COVID (Table. 1). Other boroughs, excluding Brooklyn, experienced a similar loss albeit to a lesser degree. Throughout the rest of the pandemic, we can observe the number of private establishments recover to their pre-pandemic numbers, and in all boroughs except Manhattan, exceed past. In Q3 2022, Manhattan suffered a net loss of 2,801 private

establishments since the start of the pandemic, which although is less than half of the loss compared to that of the mid-pandemic is still significant.

Table 1. Private Establishment Changes From Q4 2019 - Q3 2021/Q3 2022

Borough	PCT Δ (Q3 2021)	Total Δ (Q3 2021)	PCT Δ (Q3 2022)	Total Δ (Q3 2022)
Manhattan	-4.489%	-5774	-2.179%	-2801
Brooklyn	0.472%	306	6.959%	4510
Bronx	-0.453%	-84	3.323%	616
Queens	-1.556%	-833	2.923%	1565
Staten Island	-1.215%	-120	2.115%	209

Compared to Q3 2019, Q3 2022 had a net gain of 4,099 private establishments. It is yet unclear if this net gain can be primarily attributed to small businesses regaining a foothold in the city. However, the increase in private establishments in other boroughs (especially Brooklyn) does reaffirm Lander’s observation that businesses are moving out of the city’s center of commerce [9].

6.1.2 Business Licenses.

We can look at the number of newly registered businesses in New York City to additionally help identify the growth of small businesses. Here we aggregate the data by year and take a count of the total number of licenses opened. We look at the data in a yearly time frame as opposed to a monthly time frame as the number of registered licenses can vary significantly month by month. These fluctuations would make it difficult to locate larger trends caused by the pandemic. When looking at the yearly number of newly registered businesses as seen in Table. 2, we can see there is a 59.99% decrease in small businesses registered between 2019 and 2020. Between 2020 and 2021, however, there is a 28.88% increase in registrations. This observation suggests that many New Yorkers stopped registering for new businesses during 2020 due to the pandemic, but eventually started looking into business registration around a year later. Looking at newly registered business licenses can also give us suggestions as to the outlook on the future of small businesses. Lower trends in registration imply that people are not too confident in opening a new business, while upticks in registrations may suggest a more positive outlook.

Year	Number of Opened Licenses	Percent Change From Last Year
2019	8032	n/a
2020	3213	-59.99%
2021	4141	28.88%
2022	4484	8.28%

Table 2. Changes in New Small Business License Registrations in NYC

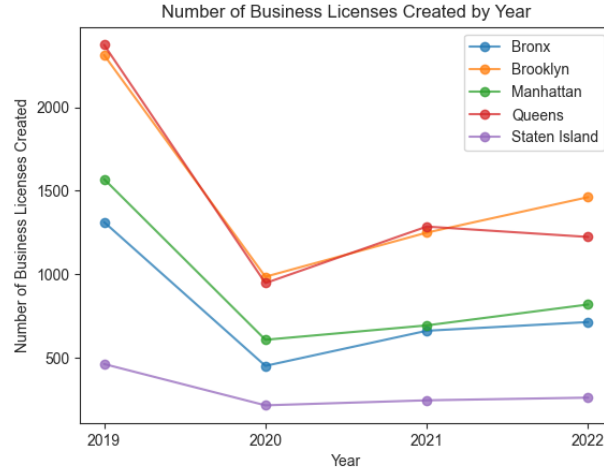


Fig. 2. New Licenses by Borough

When looking at business registrations by borough as seen in Figure. 2, we can see that all five boroughs shared similar drops in total new registrations between 2019 and 2020. Brooklyn and Queens appeared to be the two boroughs with the stronger recoveries. It is also important to note that Brooklyn and Queens had more registrations comparatively prior to the pandemic. This again ties into the ongoing trend of business owners seemingly favoring opening new businesses in boroughs outside of Manhattan.

6.2 Causes of Negative Impacts on Small Businesses

In times of fear, such as during a war, an economic recession, or even a global pandemic, people tend to become more conservative with their money. Experts recommend doing three things during a recession, reduce spending, reduce debt, and increase savings [8] (Konish, 2023). Data shows that during the pandemic, especially in the beginning, people were treating the pandemic as if it was a recession. Personal savings data shows that people were drastically cutting costs and saving money. Data on Pedestrian Volumes also emphasizes the fear people had of the virus and implies that there was less foot traffic in stores and thus less spending at businesses. This fearful mindset may explain specifically why businesses suffered in the early onset of COVID-19.

6.2.1 COVID-19 Cases.

Based on the COVID-19 day-by-day data, we are able to track trends of how the virus has spread in New York City. Instead of looking at the number of cases per day, we aggregate the number of cases by month and plot the monthly averages of COVID-19 cases (Figure. 3). COVID-19 cases appear to come in waves, where there are periods of low cases followed by sudden spikes, and then periods of low cases again. These cycles most likely follow the seasonality trends in sicknesses.

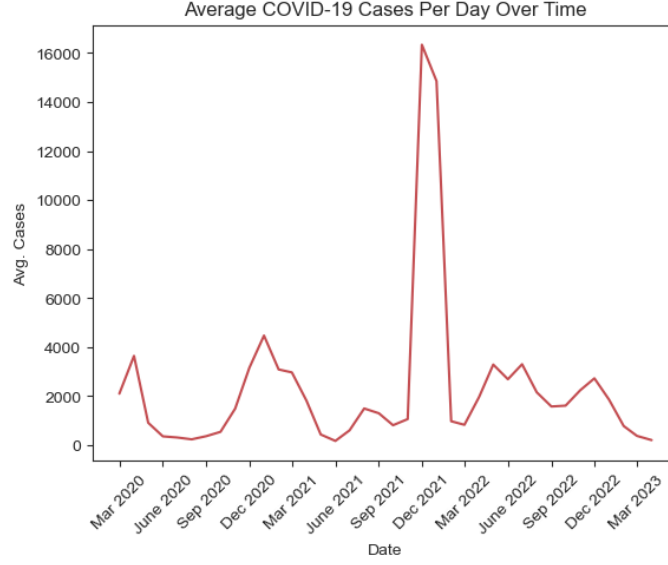


Fig. 3. Average COVID-19 Cases Over Time

When the COVID-19 virus initially appeared, there was massive fear among the public. By looking at the number of COVID-19 cases, we can get an estimate of what periods the virus spread was at its peak. This information, in combination with personal savings data, can be used to showcase when people feared COVID-19 the most throughout the pandemic. We notice that especially early in the pandemic (2020 - 2021), significant spikes in the number of COVID-19 cases correlated with more fear among citizens. However, towards the end of the pandemic, (2022 - present) despite record increases in COVID-19 cases, there was no longer any indication of fear (Figure. 4).

6.2.2 Personal Savings.

Here we plot the amount of monthly personal savings by Americans. In terms of trends, we can see specific months where there were noticeably large increases in personal savings in the country. Between March 2020 and April 2020, there was a 179.77% increase in personal savings. This correlated with a 73.27% increase in COVID-19 cases per day (Figure 4). Between January 2021 and December 2020, there was a 60.5% increase in savings in response to a 41.75% increase in COVID-19 cases per day.

Even when overlooking the significant spikes in personal savings, we also notice that the amount of personal savings generally stayed above the amount of savings pre-pandemic.

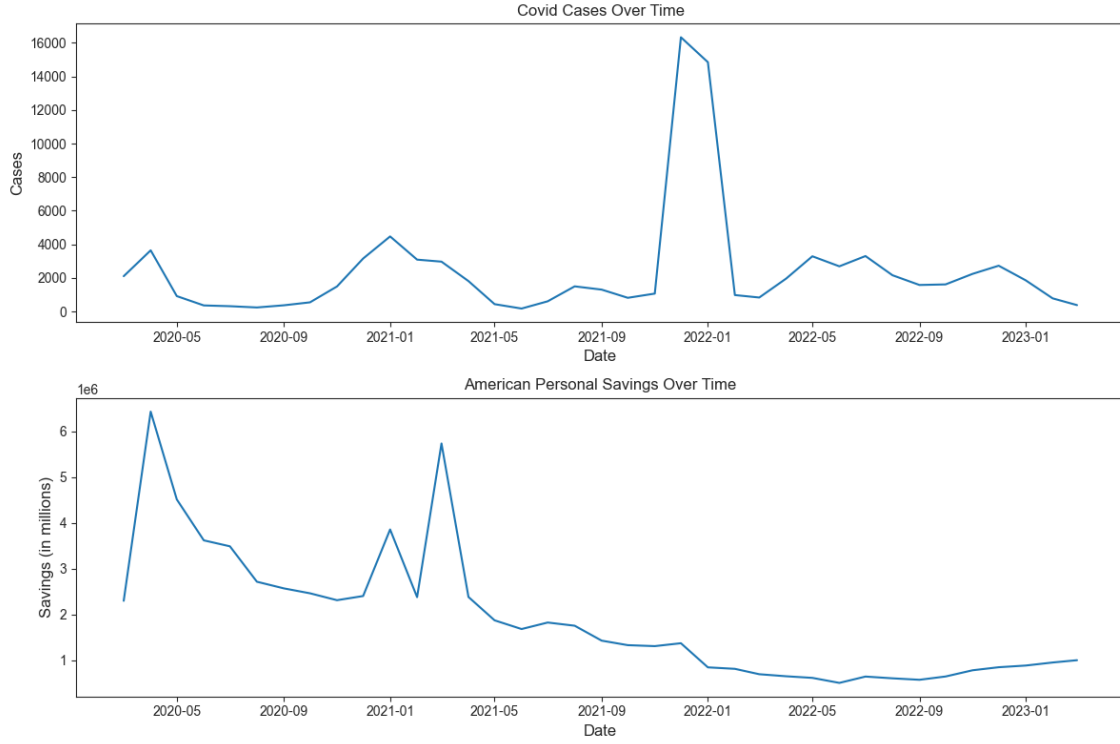


Fig. 4. Comparing Savings with COVID-19 Cases

Throughout the early pandemic, the United States' personal savings bottomed out at roughly 2.5 trillion dollars while prior to the beginning of the pandemic, American personal savings were steady at around 1.5 trillion dollars (Fig. 4). This is above and beyond what would have been saved if income and spending components had grown at pre-pandemic trends[1] (Aladangady et al., 2022). The Federal Reserve explains that throughout the pandemic, there were historic levels of government transfers that boosted American income while household spending was diminished due to social distancing. This is believed to be the cause of the astronomically high levels of personal savings. Conversely, the rise in savings and lack of spending perfectly explains why small businesses may have suffered so much during the pandemic.

6.2.3 Pedestrian Volume. Based on the values drawn from the 86 trackers placed around the city, we plotted a graph to visualize the change in pedestrian volume for each borough throughout the pandemic. There is notably a sharp decrease in pedestrian volume across all five boroughs when COVID-19 first hit NYC around Q2 2020 (Figure. 5a). This sharp dip in volume appears to persist through the end of 2020 into 2021. It is not until the latter of 2021 that volumes start to climb back up, although notably not to the levels before the pandemic.

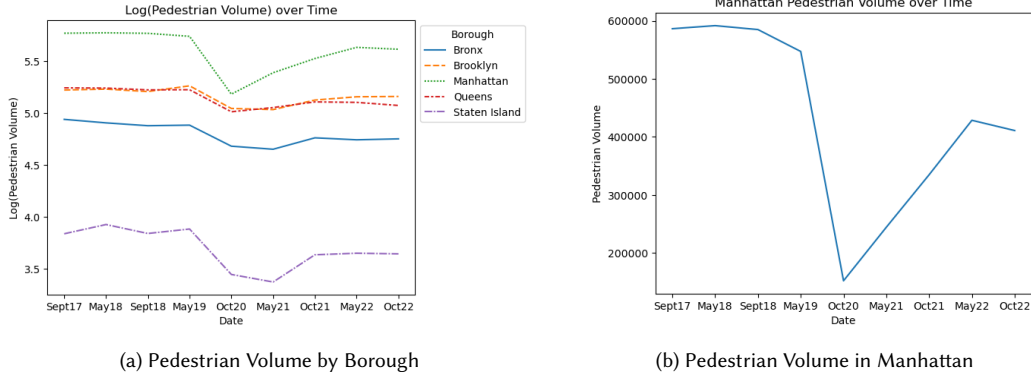


Fig. 5. Pedestrian Volume Over Time

Manhattan, in particular, suffered a 72% decrease in pedestrian volume from May 2019 - October 2020 (Table. 3). Other than Staten Island, all other boroughs suffered a little more than half the proportional loss of pedestrian volume compared to Manhattan. As businesses rely on revenue generated from in-store walk-ins, a mass decrease in foot traffic could partially explain how businesses were losing money over the pandemic. Manhattan's massive loss in foot traffic could also be explained by its dominance in the retail industry. As this data set was particularly focused on collecting data from notable retail corridors, it is not a surprise to see such a steep drop in New York's largest commerce area.

Table 3. Pedestrian Volume May 2019 - Oct 2020 by Borough

Borough	May 2019	Oct 2020	PCT Change
Manhattan	547113	152001	-72.218%
Brooklyn	182698	110619	-39.452%
Bronx	76432	47942	-37.275%
Queens	167555	102803	-38.645%
Staten Island	7648	2794	-63.468%

6.3 Explanation for Borough Changes

As noted in previous sections, certain areas of the city appear to be impacted more severely by COVID-19 compared to others. Manhattan, in particular, suffered nearly a 72% drop in pedestrian volume and a -4.5% drop in private establishments mid-pandemic. We want to investigate why there might be such a disproportionate impact across boroughs. To achieve this, we look at loans taken out by businesses through the PPP program to see if we can gain any insight.

6.3.1 PPP. In our analysis, we separated loans into different bins based on the number of employees they employed. We found that with the sole exception of businesses that have only one job reported, loans from businesses based in Manhattan were consistently much higher than the other boroughs (Figure 6). This indicates that, in general, it is much more expensive to keep a Manhattan employee employed compared to other boroughs.

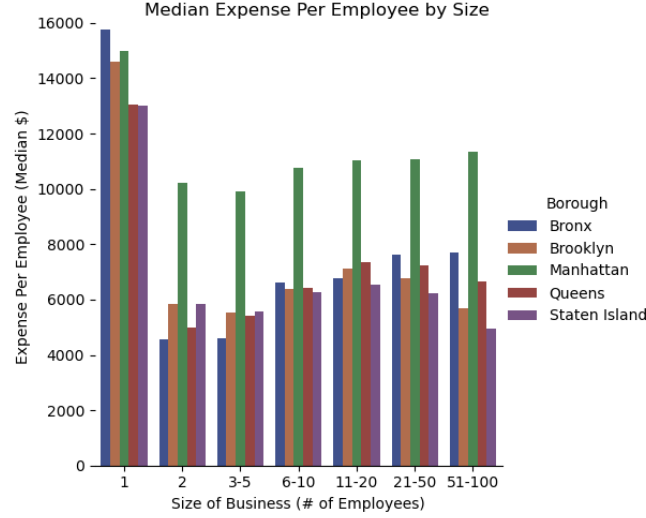


Fig. 6. Cost Per Employee by Borough

These findings could help to explain the disparity in the loss. Even at varying ranges of size, Manhattan payrolls maintain nearly 1.5 times the next highest borough. With losses of revenue due to COVID-19, it would be hard to keep businesses staffed with high payrolls. This could also help to explain the appeal of moving businesses outside of Manhattan to other boroughs such as Brooklyn. A hypothesis could be that the COVID-19 pandemic only served to exacerbate existing expense problems in certain NYC neighborhoods, thus driving out business owners in Manhattan.

6.4 Explanation for Small Business Recovery

As previously mentioned, small businesses had a "V" style recovery, where businesses seemed to recover just as fast as they deteriorated. To obtain such a recovery, there often has to be aggressive action from the government and a quick recovery from a one-time shock [10](Logue, 2022). In such a case, the economy is able to not only recover much of its losses but also grow and expand. The fall and rise of small businesses during the pandemic are representative of such a recovery. As demonstrated in Figure. 1 and Figure. 2, the number of small businesses not only recovered to pre-pandemic levels but in many cases surpassed it. In an attempt to explain this phenomenon, we look at the drop in fear of COVID-19 as well as the intense government monetary policy, particularly in the cutting of interest rates from the Federal Reserve to not only explain the recovery in small businesses, but also to infer the outlook after the pandemic.

6.4.1 No more Fear. The reasons we used to explain the fear people had of COVID-19 can also be used to show that people stopped being afraid of COVID-19. When focusing on the latter half of the pandemic (2021-2022), we can see the opposite of what we saw in the first half (2020-2021). Instead of personal savings staying high, from April 2021 on, personal savings actually steadily and consistently decreased. This implies that people began going out and spending money, which definitely helped fuel the recovery of small businesses. This pattern is seen regardless of whether the amount of COVID-19 cases increased or not. In fact, between November 2021 and January 2022 there was a 35.39%

decrease in personal savings while, at the same time, there was an all-time high number of new COVID-19 cases (Figure 5).

The drastic difference in behavior at the tail-end of the pandemic compared to the beginning of the pandemic suggests people grew to no longer be afraid of the virus and thus were willing to go out again. This is further supplemented by the upticks in pedestrian volume. It is also no coincidence that in November 2021 the Omicron Variant of COVID-19, a less severe strain became the dominant spreading strain around the world[7] (Katella, 2023), which may have contributed to people overcoming the fear of the virus. Getting over the fear of COVID-19 allowed people to be less restrictive about social distancing, and spend more money, all of which ultimately helped the recovery of small businesses.

As time goes on, COVID-19 continues to become an afterthought for people. In 2023, social distancing policies are no longer strict and definitely not enforced, and people are going out with no concern. The CDC marks May 11, 2023, as the end of the federal COVID-19 public health emergency declaration. This further shows that the public is no longer afraid of the virus, and small businesses, in the meantime, should not be hurt by social distancing policies.

6.4.2 Interest Rates. All businesses, large or small, are sensitive to interest rates. When looking at the Federal Funds rate, we can perfectly see how interest rates followed the story of the states of small businesses. When the pandemic first began in March 2020, we can see the government quickly responding by cutting interest rates nearly to 0%. This shows that the government recognized the economic slowdown from the pandemic and tried to support the economy with near-zero rates, thus allowing small businesses to continue to borrow money essentially for free. From April 2020 to the middle of 2022, interest rates remained near 0% (Figure. 7). Due to the sustained interest rate cuts and economic stimulus during the pandemic, the government created a financial environment that could foster incredible growth for all businesses, small and large. This not only enabled recovery of small business health to pre-pandemic levels but actually growth beyond that.

In fact, it is believed that a low-interest rate environment stimulated too much growth in the economy. The rapid rise of interest rates by the Federal Reserve beginning in the latter half of 2022 is an indication that the economy and inflation are growing *too quickly*. Although this information is supportive of the quick recovery of small businesses post-pandemic, it is also a cause for worry. The rise in interest rates from near 0% to near 5% from the Fed will be a major burden for small businesses, most definitely stunting growth, and forcing businesses to rethink their inventory purchases, investments, and even hiring[11] (Marks, 2023).

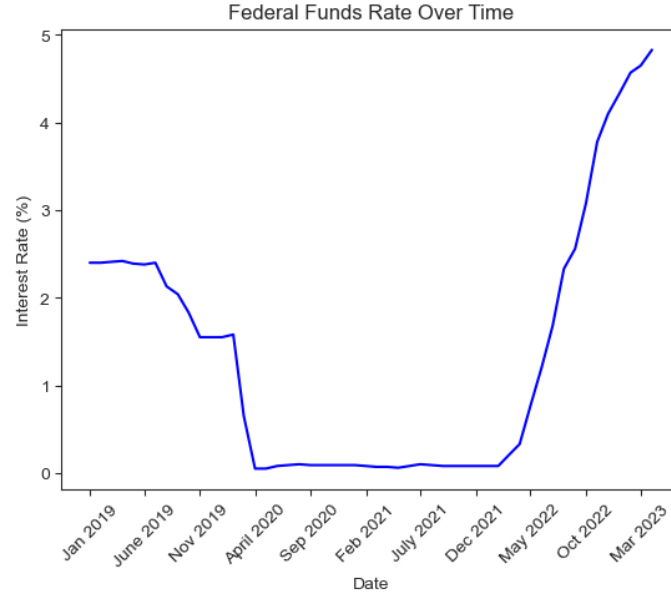


Fig. 7. Interest Rates Over Time

7 CONCLUSION

The initial impact the COVID-19 pandemic had on small businesses cannot be understated. The results from our various proxy measures show that, in the early months of COVID-19, there were significant signs of the deteriorating health of small businesses such as the number of private establishments and newly opened businesses in the city. Fear-induced drops in pedestrian volume and increases in personal savings may help to explain why businesses may have taken such a massive hit. In addition, we also examined how the widespread effects of COVID-19 varied geographically, with the main brunt of losses being in Manhattan. We show that, in the context of broader developments in the city, the COVID-19 pandemic simply accelerated existing trends.

As part of our analysis, we wanted to examine if small businesses were able to recover towards the tail-end of the pandemic. Interestingly, the negative impact of COVID-19 seemed to also be short-lived. Our results point to major recoveries beginning across the board by the end of 2020. By the end of 2022, we can observe interest rates rising and the number of private establishments soaring way above pre-pandemic levels. The cause of the recovery does not appear to be the virus going away, as shown by high rates of infection in early 2022 (omicron strain). Instead, evidence points towards people getting over the pandemic with personal savings dropping (spending increase), locals and tourists returning to the city, and possibly policies surrounding COVID-19 being lifted such as social distancing.

Much of the analysis conducted in this study was done using proxy measures for business health. As there is not widely available data specifically regarding small businesses in New York City, we extrapolated data where we could under the premise that New York City trends would follow Nationwide trends. As such, the findings in this report may not be 100% accurate to the precise ecosystem of small businesses in NYC, but we make an effort to be as close as possible. As more economic data becomes widely available, future studies could look to see if the trends observed in this study persist. Other areas of further study could expand on employee data and how workers have been displaced

throughout the pandemic, the revenues generated by small businesses around the city, or how certain demographics of people might have been affected differently by the pandemic.

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