A Sick Anomaly: Exploring the Effects of COVID on the U.S. Stock Market

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Undergraduate Honors Thesis
May 2023

Keywords: COVID-19, US Stock Market, US Economy, Stock Returns, S&P 500

JEL Classification: G14, G23, I10

Abstract

It is not unreasonable to surmise that public sentiment views stock market behavior as an indicator of economic health. Historically, movements in the stock market indeed correspond to business cycles, but this is not always the case, and the COVID-19 pandemic serves as a distinct case to highlight such an irregularity. The contrast between the behavior of the stock market and that of the economy during the pandemic compels an analysis of the pandemic's actual impact on the stock market, and this paper finds a negative and significant relationship between the interpolated daily closing prices of the S&P 500 and the daily number of COVID-19 cases.

I. Introduction

Real GDP in the US has steadily increased for more than the past 70 years.[1] Similarly, the stock market has also maintained a stable path upwards for essentially the same time, exemplified through one of the major US stock indexes, the S&P 500.[2] Comparably, they share similar movements with one another, indicative of a positive relationship between the two. Indeed, this relationship is also supported by economic literature, such as "Stock Markets, Banks, and Economic Growth" by Ross Levine and Sara Zervos (1998) and "Stock Markets, Banks, and Growth" by Thorsten Beck and Ross Levine (2004), albeit in much more specific contexts than a glance at a few simple time series would reveal.

Nonetheless, there are anomalies. At the end of year 2020, real GDP growth in the US had declined 3.5% (from the 2019 annual level to the 2020 annual level),[3] whereas the S&P 500 finished the year up more than 16%[4] after a near 65% climb from its March low.[5] Additionally, the year concluded with close to 20 million cumulative cases in the US.[6] Essentially, during the initial year of the pandemic, in spite of COVID-19 continuing to surge and the economy ergo suffering a notable blow, the stock market reached record highs.

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[1] U.S Bureau of Economic Analysis, "Real Gross Domestic Product [GDPC1]," *FRED*, https://fred.stlouisfed.org/series/GDPC1

[2] Yahoo! Finance, "S&P 500 (^GSPC) Charts, Data, & News - Yahoo Finance," *Yahoo! Finance,* https://finance.yahoo.com/quote/%5EGSPC/chart/

[3] U.S. Bureau of Economic Analysis, "Gross Domestic Product, Fourth Quarter and Year 2020 (Second Estimate)," *U.S. Bureau of Economic Analysis,* February 25, 2021, https://www.bea.gov/news/2021/gross-domestic-product-fourth-quarter-and-year-2020-second-estimate

[4] Hamza Shaban, Heather Long, "The stock market is ending 2020 at record highs, even as the virus surges and millions go hungry,," *The Washington Post,* December 31, 2020, https://www.washingtonpost.com/business/2020/12/31/stock-market-record-2020/

[5] Anna-Louise Jackson, Benjamin Curry, "2020 Stock Market in Review: A Year That Defied Expectations," *Forbes,* December 14, 2020, https://www.forbes.com/advisor/investing/stock-market-year-in-review-2020/

[6] Centers for Disease Control and Prevention, "Trends in Number of COVID-19 Cases and Deaths in the US Reported to CDC, by State/Territory," *Centers for Disease Control and Prevention,* https://covid.cdc.gov/covid-data-tracker/#trends_totalcases_select_00

Historical intuition would reasonably conjecture—and historical patterns would suggest—that a major negative exogenous shock to the economy, such as COVID-19, would have a negative impact on the stock market. The stock market is generally known to react to "bad" news with a proportionately (or disproportionately) negative response. In fact, at the beginning of the pandemic in the US, the stock market responded "appropriately," or rather in alignment with historical intuition and historical patterns. The Dow Jones Industrial Average, S&P 500, and the Nasdaq plunged 12.9%, 12%, and 12.3%, respectively, recording historic lows.

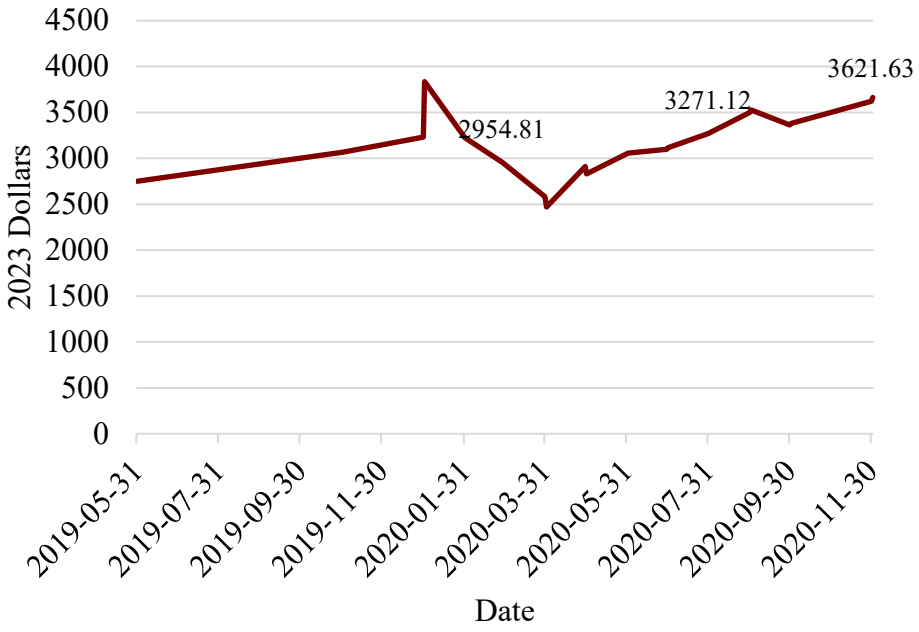
However, the market quickly recovered, and by August 2020, the S&P 500 returned to its pre-pandemic highs.[7] In contrast, popular indicators of economic health such as the unemployment rate[8] and real GDP[9] did not enjoy the same robust recovery, failing to return to their pre-pandemic levels even by the end of the year.

[7] Bob Pisani, "One year ago stocks dropped 12% in a single day. What investors have learned since then," *CNBC,* March 16, 2021, https://www.cnbc.com/2021/03/16/one-year-ago-stocks-dropped-12percent-in-a-single-day-what-investors-have-learned-since-then.html

[8] U.S Bureau of Labor Statistics, "Unemployment Rate [UNRATE]," *Federal Bank of St. Louis (FRED)*, https://fred.stlouisfed.org/series/UNRATE

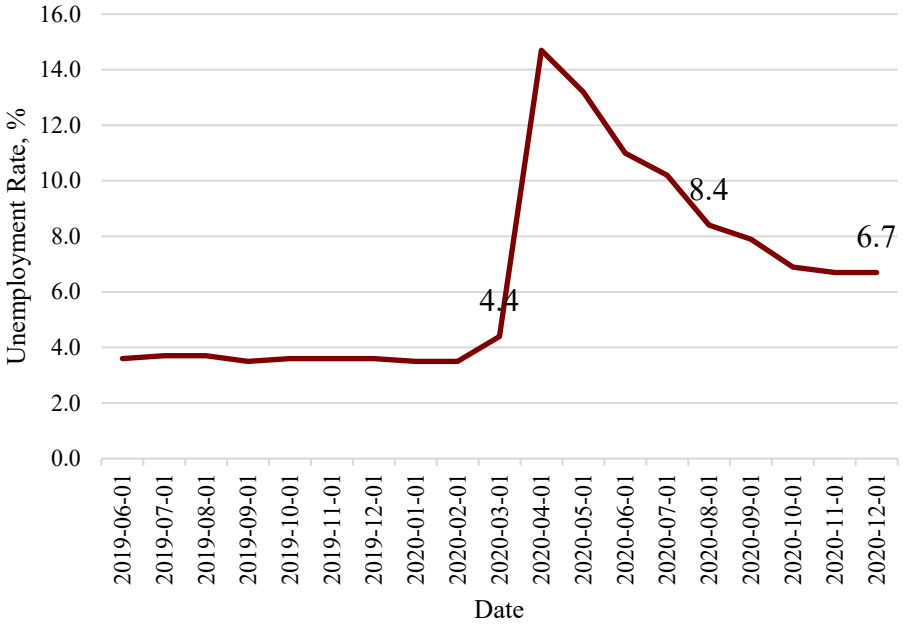
[9] U.S Bureau of Economic Analysis, "Real Gross Domestic Product [GDPC1]," *FRED*, https://fred.stlouisfed.org/series/GDPC1

Figure 1.1 *Pre- and Post-Pandemic S&P 500 Closing Prices, May 2019 to Dec 2020*



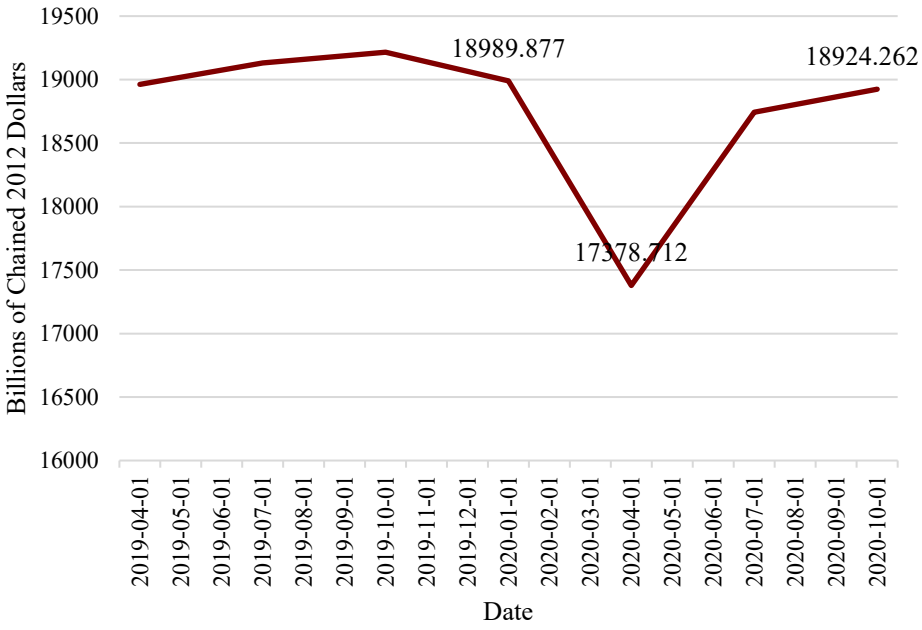
Source: Nasdaq

Figure 1.2 *Pre- and Post-Pandemic Unemployment Rate in the US, June 2019 to Dec 2020*



Source: FRED

Figure 1.3 *Pre- and Post-Pandemic Real Gross Domestic Product in the US, April 2019 to Oct 2020 (Quarterly)*



Source: FRED

Although the stock market is not the economy and vice versa, one would expect a similar response from both in an economic shock as extreme as a pandemic. Therefore, given the context, this juxtaposition in performance between the economy and the stock market motivates—and possibly even warrants—a deeper look into the impact that COVID-19 had on the stock market. Such analysis could possibly allow for a reevaluation of the relationship between the stock market and the economy, appropriately timed considering the historic nature and gravity of the economic shock that is the COVID-19 pandemic—although this is outside of the scope of this paper.

Using the S&P 500, a major US stock index, as a representative sample of the stock market, I find that a negative and significant relationship exists between interpolated and weekly

averaged daily S&P 500 closing prices and the weekly averaged number of daily new COVID-19 cases, but also that investors' concerns may have diminished over time.

II. Literature Review

As previously mentioned, there does exist economic literature regarding the general relationship between the economy and the stock market outside of the context of the COVID-19 pandemic. Levine and Zervos (1998) find that stock market liquidity is "positively and significantly correlated with current and future rates of economic growth, capital accumulation, and productivity growth," utilizing data on 47 countries from 1976 through 1993. Controlling for relevant variables, their empirical analysis uncovers stock market liquidity as a "robust predictor of real per capita gross domestic product (GDP) growth, physical capital growth, and productivity growth." Furthermore, they find the "level of banking development" as another significant indicator of the listed facets of economic growth.[10]

Essentially, Levine and Zervos (1998) reveal a specific link between the stock market and the economy, empirically discovering a relationship between the two that is channeled through a distinct aspect of the stock market, which, in this case, is market liquidity. Concluding that "financial factors" such as stock market liquidity are an "integral part" of economic growth,[11] Levine and Zervos (1998) illustrate a positive relationship between the stock market and the economy.

Similarly, Beck and Levine (2004) find a significant and positive relationship between the stock market and the economy. Averaging data over five 5-year periods between 1976 and

[10] Ross Levine and Sara Zervos, "Stock Markets, Banks, and Economic Growth," *American Economic Review* 88, no. 3 (1998): 538, https://www.jstor.org/stable/116848
[11] Ross Levine and Sara Zervos, "Stock Markets, Banks, and Economic Growth," *The American Economic Review* 88, no. 3 (1998): 554, https://www.jstor.org/stable/116848

1988 from a panel of 40 countries and 146 observations,[12] they econometrically establish that the "development of stock markets and of banks have both a statistically and economically large positive impact on economic growth."[13] Thus, Beck and Levine (2004), like Levine and Zervos (1998), find that the stock market has a positive relationship with the economy.

A much more recent study on this topic is that of Chodorow-Reich et al (2021). They report that an "increase in the stock market causes faster employment and payroll growth in counties with higher stock market wealth." Moreover, this effect, they write, is "pronounced in industries that produce nontradable goods and in residential construction," and is not found in "industries that mostly produce tradable goods."[14] In contrast to the previously discussed works, Chodorow-Reich et al (2021) establishes a much narrower relationship between the stock market and the economy, looking at how the stock market affects local labor markets at the county level and the industry level. Nevertheless, they establish a positive relationship between the stock market and the economy like the aforementioned literature.

Therefore, clearly, existing economic literature establishes a relationship between the stock market and the economy. However, the studies discussed above mainly focus on the positive relationship between the stock market and the economy. Knowing that the stock market and the economy are historically said to share a positive relationship with one another renders the anomalous case of the stock market during the COVID-19 pandemic to be even more intriguing. Unfortunately, whether due to a lack of interest or to lags in the research publication

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[12] Thorsten Beck and Ross Levine, "Stock Markets, banks, and growth: Panel evidence," *Journal of Banking & Finance,* 28, no. 3 (2004): 427, https://doi.org/10.1016/S0378-4266(02)00408-9

[13] Thorsten Beck and Ross Levine, "Stock Markets, banks, and growth: Panel evidence," *Journal of Banking & Finance,* 28, no. 3 (2004): 427, https://doi.org/10.1016/S0378-4266(02)00408-9

[14] Gabriel Chodorow-Reich, Plamen T. Nenov, and Alp Simsek, "Stock Market Wealth and the Real Economy: A Local Labor Market Approach,"*American Economic Review,* 111, no. 5 (2021): 1627, https://doi.org/10.1257/aer.20200208

process, not much literature exists regarding both the stock market and the economy during the pandemic.

One study that does look at this is that of Thorbecke (2020). Thorbecke (2020) looks at stock returns for 125 sectors in the US during the pandemic, considering the time period between February 19, 2020 and July 10, 2020. Investigating how "the macroeconomic environment and sector-specific factors affect returns," the study finds that the pandemic was a "key" driver of responses in the stock market.[15] He concludes that the pandemic acted as an event that brought about "idiosyncratic responses," adversely affecting various sectors of the economy such as airlines, real estate, tourism, and oil. He also attributes losses in certain sectors to "macroeconomic factors."[16]

Thorbecke's results serve to demonstrate the initial negative effects of the pandemic on both the stock market and the economy. In fact, he fundamentally uses the stock market to diagnose the state of the US economy at the time, essentially establishing the stock market as a direct indicator of economic performance. Given the time period he considers—the first several months of the pandemic—such a relationship is justified. However, Thorbecke (2020) does not consider the later months in 2020 when the anomalous contrast in the stock market's performance and the economy's performance begin to occur. Thus, an advantage of my approach is the more temporally holistic view on the relationship between the stock market and the economy that highlights the exceptional phenomenon at hand. While a look at the "pre-anomaly" time period may motivate an analysis of how the pandemic affected the economy through the stock market like it did for Thorbecke, a look at the time period in which the anomaly began to

[15] Willem Thorbecke, "The Impact of the COVID-19 Pandemic on the U.S. Economy: Evidence from the Stock Market," *Journal of Risk & Financial Management,* 13, no. 10 (2020): 235, https://doi.org/10.3390/jrfm13100233
[16] Willem Thorbecke, "The Impact of the COVID-19 Pandemic on the U.S. Economy: Evidence from the Stock Market," *Journal of Risk & Financial Management,* 13, no. 10 (2020): 235, https://doi.org/10.3390/jrfm13100233

manifest itself motivates an analysis of how the pandemic specifically affected the stock market given how different its response to the pandemic was compared to that of the economy later in the year in which the crisis began.

A more international perspective on this issue can be accredited to Capelle-Blancard and Desroziers (2020). Collecting data from 74 countries between January 2, 2020 and April 30, 2020, Capelle-Blancard and Desroziers (2020) look at how the spread of COVID-19 and public sentiment regarding the virus (which was measured using Google Trends) affected returns of major stock indexes.[17] Although they consider a time period earlier than that of Thorbecke (2020), the aforementioned temporal argument does not hold because they focus on countries other than the US. Unrestrained by the bias of the pre-anomaly case of the US, they empirically conclude that the pandemic had significant negative effects on stock market returns in terms of COVID-19 cases and public sentiment.[18] However, interestingly, they also find that after central banks intervened, "shareholders no longer seemed troubled by the news of the health crisis, and prices rebounded all around the world."[19] A similar narrative for the US may be constructed from results, which I will discuss later.

III. Data & Methodology

3.1. Data

For my core data, I use two daily-level datasets, one acquired from the CDC's website and the other from the Bloomberg Terminal at Boston College. From the CDC, I obtained daily-level data on the number of new COVID-19 cases starting from January 23, 2020, the earliest

[17] Gunther Capelle-Blancard and Adrien Desroziers, "The Stock Market is not the Economy? Insights from the Covid-19 Crisis," *CEPR Covid Economics,* (2020): 10-11, https://dx.doi.org/10.2139/ssrn.3638208
[18] Gunther Capelle-Blancard and Adrien Desroziers, "The Stock Market is not the Economy? Insights from the Covid-19 Crisis," *CEPR Covid Economics,* (2020): 21-22, https://dx.doi.org/10.2139/ssrn.3638208
[19] Gunther Capelle-Blancard and Adrien Desroziers, "The Stock Market is not the Economy? Insights from the Covid-19 Crisis," *CEPR Covid Economics,* (2020): 1, https://dx.doi.org/10.2139/ssrn.3638208

available date, to September 20, 2022, the day the dataset was downloaded. From the Bloomberg Terminal, after choosing the S&P 500 as the representative sample for the stock market as the S&P 500 due to its significance as a major US stock index, I obtained daily-level data on S&P 500 closing prices.

Naturally, I applied the same time period for the S&P 500 data.[20] Given how this paper is motivated by the stark difference in recovery between the stock market and the economy starting from the later months of 2020 and going into 2022, I decided that simply ending the time period at the date that the datasets were downloaded would suffice to empirically derive reasonable results of the pandemic's impact on the stock market. The relationship between the daily number of new COVID-19 cases and S&P 500 closing prices most likely diminishes during 2022 when people have become accustomed to the pandemic, health regulations are much more relaxed, public sentiment does not exhibit the same level of concern as it did initially, and other events have occurred that more strongly affect the stock market such as the Fed raising interest rates to battle inflation or Russia's war with Ukraine. Therefore, I argue that adding more days to the dataset than necessary in retrospection falls victim to diminishing marginal returns in terms of explanatory power.

As seen in Table 3.1, for the daily number of new COVID-19 cases, there are a total of 972 observations with mean 97,702.32 and standard deviation 130,254.6. For daily S&P 500 closing prices, there are a total of 670 observations with mean 3,877.322 and standard deviation 577.4906. Note that for the S&P 500 closing prices, the number of observations is not equal to

[20] Note that due to the inherent temporal homogeneity in the data, I did not need to drop any observations after merging the two datasets as all observations were matched, so the merged dataset will be used to describe the overall data since the master dataset and the using dataset are the same as their originals.

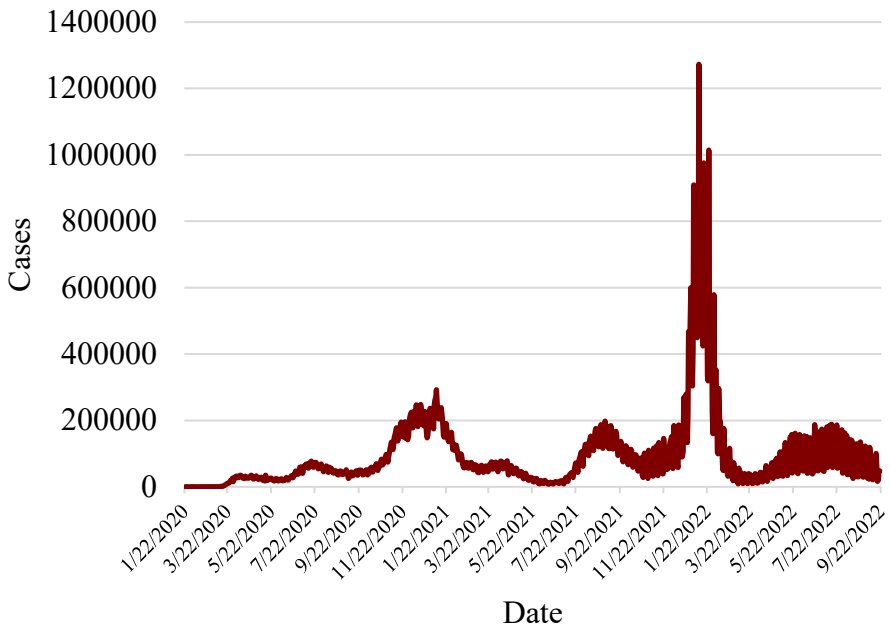
that of the number of COVID-19 cases. These dates with missing observations for closing prices can be explained by the stock market closing on weekends and U.S. holidays.

Table 3.1 *Descriptive Statistics of Initial Key Variables, Daily Level*

Variable	Obs	Mean	Std. dev	Min	Max
New Cases	972	97702.32	130254.6	0	1272895
Closing Prices	670	3877.322	577.4906	2237.4	4796.56

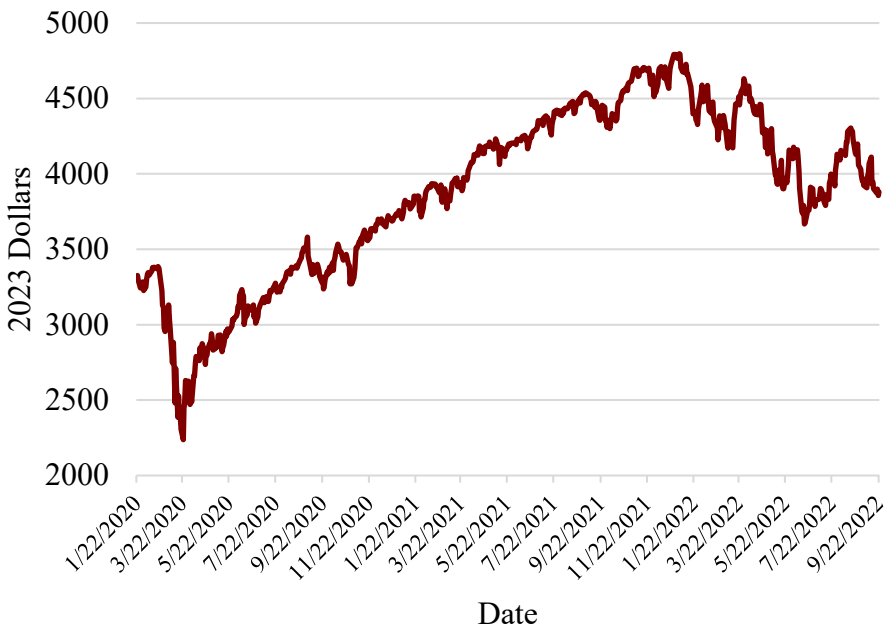
Source: Author's calculations in Stata

Figure 3.1 *Daily New COVID-19 Cases in the US, Jan 2020 to Sep 2022*



Source: CDC

Figure 3.2 *S&P 500 Daily Closing Prices, Jan 2020 to Sep 2022*



Source: Bloomberg Terminal

To account for the missing observations in the S&P 500 closing prices, I interpolated stock prices to fill in the dates with such missing observations. This presents itself as the superior option to replacing missing observations with zeroes as that would negatively bias the regression results. Additionally, given the time trend of the S&P 500 data, analyzing how the pandemic exactly affected the stock market necessitates looking at the index behavior at a marginal level through a first-difference estimator.[21] Thus, I difference the natural log of the interpolated closing prices.

Other data I obtained to use as additional controls in our regression model consist of a daily-level measure of news sentiment from the San Francisco Fed's daily news sentiment index, a weekly measure of relative interest on COVID-19 on Google from Google Trends, weekly

[21] In fact, because many of my variables are time series variables, I made sure to perform Dickey-Fuller tests on them to ensure the correct specification of each variable (i.e., differenced or not depending on test results) was included in the model.

unemployment claims, monthly retail sales, the CPI (published monthly), and the weekly federal funds effective rate. Due to the chiefly weekly nature of most of our data, I use the weekly averages of daily-level variables. This also serves to control for noise in the stock market produced on the daily level and to smooth out the movement of daily S&P 500 closing prices along with that of new daily COVID-19 cases. Using a weekly-level model also allows us to view the issue from an investor's perspective on a relatively broader and more aggregate temporal scale, additionally "smoothing out" investor behavior in the quasi-long run. Also note that retail sales and the CPI, as monthly variables, had to be interpolated to be included at the weekly level. Descriptive statistics of these data can be seen below in Table 3.2, along with graphs of our new weekly averaged key variables.

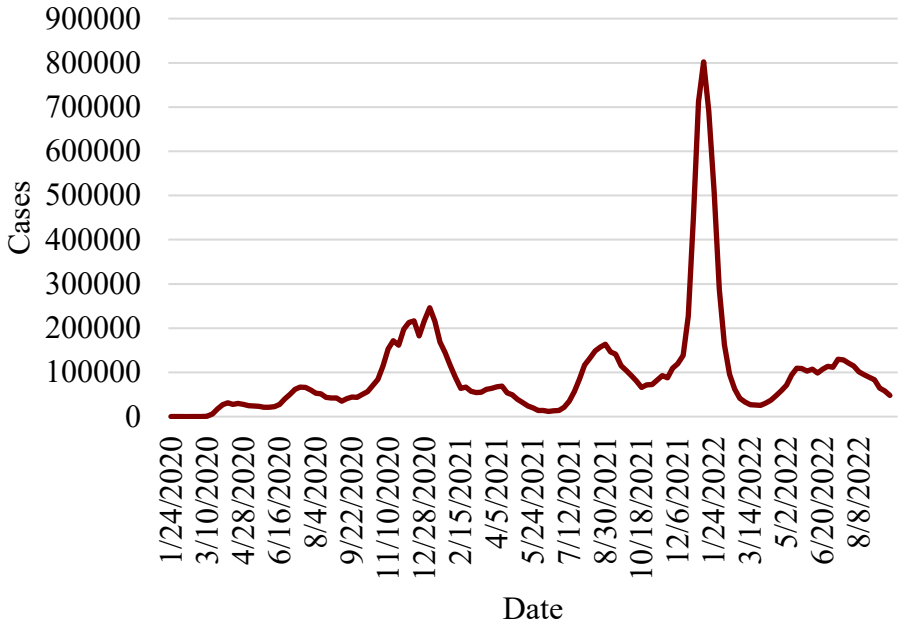
Table 3.2 *Descriptive Statistics of All Qualitative Variables, Weekly Level*

Variable	Obs	Mean	Std. dev	Min	Max
New COVID Cases, Weekly Averaged	140	97149.64	120976.3	.5714286	802140.7
Interpolated S&P 500 Closing Prices, Weekly Averaged	140	3876.125	574.0495	2367.15	4782.607
Sentiment Index, Weekly Averaged	140	-.1392064	.2119718	-.6589016	.1763075
Google Trends (Relative Interest)	140	33.43571	18.48009	0	100

Retail Sales	33	597598.7	71570.67	407025	685685
Interpolated Retail Sales	138	599149.5	69877.33	407025	685685
CPI	33	271.9285	13.51627	255.868	296.539
Interpolated CPI	138	272.1221	13.23535	255.868	296.539
Fed Funds Rate	140	.4037143	.657112	.04	2.33

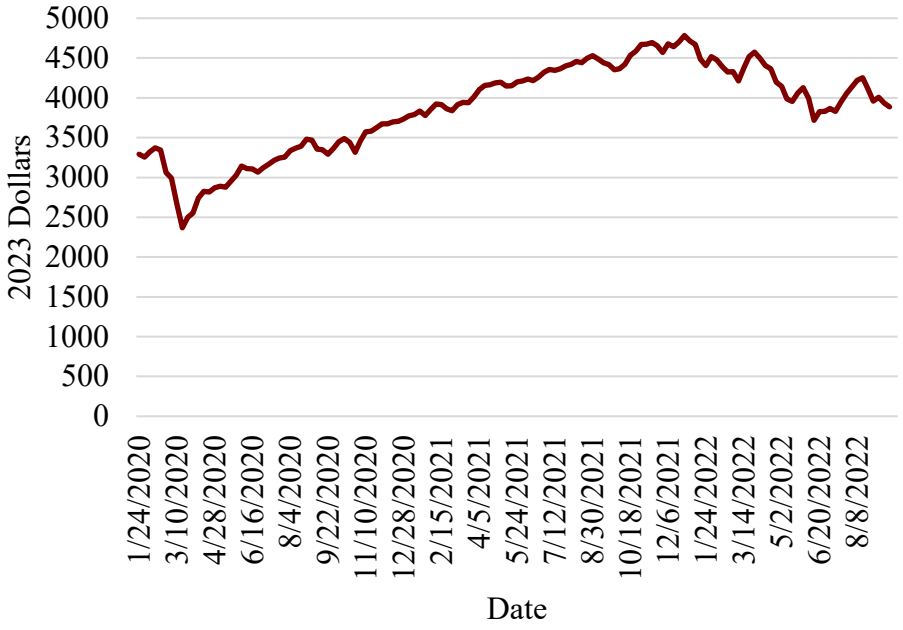
Source: Author's calculations in Stata

Figure 3.3 *Weekly Averaged Daily New COVID-19 Cases in the U.S., Jan 2020 to Sep 2022*



Source: Author's calculations in Stata

Figure 3.4 *Weekly Averaged and Interpolated S&P 500 Daily Closing Prices, Jan 2020 to Sep 2022*



Source: Author's calculations in Stata

3.2 Methodology

Our regression model using the data described above can be seen below. The quantitative variables previously described that are interpolated, differenced, weekly averaged, and/or lagged are subscripted with an I, D, A, and/or L, respectively. I include in addition to these quantitative variables a few qualitative variables: specifically, binary variables to indicate significant events during the time period considered that could help explain the movement of the S&P 500. *Spike, Crash, Vaccine,* and *Ukraine* each control for the large spike in new COVID cases that can be seen in Figures 3.1 and 3.3, the market crash during the pandemic's inception, the first major announcement relating to a vaccine, and the beginning of the Russian invasion of Ukraine, respectively.

$$Log\ Closing\ Price_{I,D,A} = \beta_0 + \beta_1\ New\ Cases_{A,L} + \beta_2\ Sentiment_{A,D} + \beta_3\ Google\ Trends_{L} + \beta_4\ Claims_{D} + \beta_5\ Log\ Retail\ Sales_{I,D} + \beta_6\ Log\ CPI_{I,D} + \beta_7\ Fed\ Funds\ Rate_{D} + \beta_8\ Spike + \beta_9\ Crash + \beta_{10}\ Vaccine + \beta_{11}\ Ukraine + u$$

Like closing prices, I take the difference of many variables—such as sentiment, unemployment claims, interpolated retail sales, interpolated CPI, and the federal funds effective rate—included in our regression after performing Dickey-Fuller tests for each of them. Naturally, I take the difference of the variables that fail to reject the presence of a unit root. An additional time-series approach I take is the lag of the number of new COVID-19 cases and the lag of the relative interest on COVID-19 on Google, which turns out to be significant against their respective unlagged specifications. Taking the lag of these variables is reasonable considering that there should be a lag effect in the stock market in regards in investor's responses to updates on COVID, such as daily announcements on new cases and Google searches.

The San Francisco Fed's measure of daily news sentiment and Google Trends' measure of relative interest on COVID-19 essentially serve as a proxy for public sentiment. The former accounts for general public sentiment, whereas the latter specifically accounts for public sentiment surrounding the pandemic. Unemployment claims, retail sales, the CPI, and the federal funds effective rate are all conventional macroeconomic variables to control for investor behavior—and ergo movements in the S&P 500—influenced by certain macroeconomic conditions.

IV. Results

The results of our regressions model can be seen below in Table 4.1. Overall, the model has an R-squared of 0.373, explaining close to 40% of the variation in weekly averaged S&P 500 returns—which is quite decent considering the high volatility and heavily multifaceted nature intrinsic to the stock market.

Agreeing with economic intuition and literature, the lagged weekly average of daily new COVID-19 cases appears to have a significant negative effect on the weekly average of interpolated S&P 500 returns. On average, one additional case decreases weekly averaged S&P 500 returns by 0.00000632%. Although at face value this estimate may seem small, this means that 10,000 additional cases at a weekly average brings down S&P 500 returns by 0.0623%, which is a nontrivial amount. In fact, going off the mean of 97149.64 from the weekly averaged COVID-19 data, I can say that each week, on average, additional COVID-19 cases decreased S&P 500 returns by 0.61%, which is nearly one percent. Clearly, COVID-19 cases had a notable effect on S&P 500 returns at the weekly averaged level.

The San Francisco Fed's measure of daily news sentiment and Google Trends' measure of relative interest on COVID-19 both have significant positive effects, which is interesting. This may be because for the whole time period being considered, public sentiment regarding COVID-19 ameliorated over time. In hindsight, interactions between controls for public sentiment and the time period of 2020 when COVID-19 should have been most prevalent in media should have been included to see if public sentiment during the height of the pandemic was negative and if it had a significant negative effect as one may expect.

All macroeconomic variables except for the CPI had significance. Retail sales had a significant positive effect as expected, but unemployment claims and the federal funds effective

rate exhibit a positive relationship, which clashes with economic theory. Intuitively, unemployment claims and the federal funds effective rate, regardless of significance, should share a negative relationship with stock market returns. Although I are not sure why unemployment claims have a significant positive effect, I can construct somewhat of a narrative as to why the federal funds effective rate has such an effect. Considering that the controls for sentiment are also positive and significant, I hypothesize that the increase in the federal funds effective rate could have signaled to investors that the central bank thought the economic situation to be improving, fueling positive sentiment and, thus, incentivizing investment. As mentioned earlier, this narrative agrees with the one of the findings of Capelle-Blancard and Desroziers (2020): that investors' concerns diminished once central banks intervened. Nevertheless, like with the sentiment variables, I could have interacted our macroeconomic variables with a time indicator for 2020 to better capture the negative effects the pandemic should have had at some point on macroeconomic conditions.

In terms of the time indicators, *Crash* naturally had a significant negative effect, the market crash of 2020 being when stocks suffered the most damage. *Vaccine* has a positive but insignificant effect, exhibiting the correct sign but no statistical significance. Similarly, *Ukraine* has a negative but insignificant effect. These variables being in the right direction but being insignificant could suggest that, from an investor's perspective, these events were "baked into" the market. *Spike* has a positive sign, which initially may seem like the variable is in the wrong direction, but considering the huge spike in cases occurred very late into the pandemic, I can surmise that at that point, investors—along with the general population—had grown accustomed to the pandemic, and that the pandemic no longer had a hold over the stock market.

Table 4.1 *Results from Regression Analysis*

VARIABLES	(1) Weekly-Level Regression Model
L. New Cases	-6.23e-08**
	(2.54e-08)
D. Sentiment	0.0871*
	(0.0480)
L. Google Trends	0.000322*
	(0.000180)
D. Claims	3.02e-08***
	(6.61e-09)
D. Log Interpolated Retail Sales	1.020***
	(0.232)
D. Log Interpolated CPI	-0.898
	(3.060)
D. Fed Funds Rate	0.0304*
	(0.0170)
Spike	0.00165
	(0.00788)
Crash	-0.0174*
	(0.00960)
Vaccine	0.00303
	(0.00545)
Ukraine War	-0.00711
	(0.00812)
Constant	-0.00421
	(0.00647)
Observations	137
R-squared	0.373

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Author's calculations in Stata

V. Conclusion

Although the stock market and the economy have been shown to share a positive relationship with one another historically and in economic literature, and although they were both initially affected similarly at the start of the pandemic, a holistic look at the pandemic will uncloak that the stock market ultimately recovered quicker than the economy did. Such a contrast in behavior for two facets of society that are traditionally known to move together motivated a look into how

the pandemic exactly affected the stock market. A more retrospective and consequently more comprehensive analysis of COVID-19's impact on the stock market has thus been conducted in this paper with the amount of data that is available now. Such a novel analysis allows to see if the pandemic actually had a negative effect on the stock market, like intuition would surmise—and it appears that intuition is confirmed with a potential small caveat concerning the pandemic's diminishing hold over investor behavior.

Overall, I can conclude from our results that the number of new COVID-19 cases had a significant negative impact on S&P 500 returns, specifically on the weekly averaged level. On a broader and more speculative note, I can conclude that the pandemic did influence stock market returns in the U.S., but that its negative effect diminished overtime as time progressed and society adjusted itself to what many refer to as the "new normal." Even controlling for inflation, which turned out to be insignificant, my model shows that the federal funds effective rate had a significant but strangely positive effect on S&P 500 returns, and this result, paired with the positive and significant estimate on the San Francisco Fed's daily news sentiment index, could suggest that the Fed raising interest rates could have actually encouraged investment behavior as a signal of the pandemic waning in its influence over the economy. Although this is most likely a conjectural stretch, if such a relationship is assessed and affirmed in future research, this result could have policy implications for the Fed's approach to major exogenous shocks such as the pandemic within the context of investment behavior.

Our regression model, while well-specified and adequately explanatory, possesses some weaknesses. First, as a general weakness with any regression model dealing with stock returns, the stock market is very difficult to explain due to the multitude of factors—tangible and intangible, quantitative and qualitative, measurable and immeasurable—that affect it.

Second, more specifically, I could have included more time indicators for significant events during the pandemic. There are several major events other than the ones included in our model, such as announcements from the CDC or the Federal Reserve. For example, I could have included when the government first declared it would provide stimulus checks. Additionally, in regards to time indicators, as mentioned previously, I could have interacted variables in our regression with an indicator for 2020 when the pandemic most likely had the strongest negative effects on various aspects of society and the economy. This could have better captured the intensity the pandemic exhibited during a good portion of the time period I consider and further improved the explanatory power of our model by aligning some of the results with economic intuition. For example, when interacted with an indicator for 2020, the variable for Google Trends may have been negative instead of positive as intuition would dictate, and, similarly, the variable for unemployment claims may have also been negative instead of positive as I would expect it to be.

Third, I did not control for disposable income, even though that would have played a role in investment behavior and, thus, in explaining the stock market, considering that disposable income increased notably during the pandemic due to government stimulus checks. This variable would help explain more of the variation in the stock market, and omitting it therefore likely violates the assumption of the error term being uncorrelated with the independent variables.

VI. References

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