

The Dynamic Impact of COVID-19 Pandemic on U.S Stock Market Returns

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Abstract. The global stock market experienced significant detrimental effect during the COVID-19 pandemic era. In the United States, the pandemic had considerable influence on the stock market. Notably, the pandemic negatively impacted the stock market from March, 2020, before there was a recovery from Dec, 2020. During this period, the pandemic significantly increased risks and uncertainties in the U.S. stock market. Particularly, the S&P 500 index during that period exhibits the dynamic significance of coronavirus on the stock market. Price movements in the financial markets resulted from price changes in the S&P 500, which led to a market meltdown. The COVID-19 index raised volatility, which sparked frenetic trading on the stock market. Notably, the epidemic flare-up had caused the S&P 500 index to lose 34% of its value as of August 2020. Also, the index's value fell by 86% as a result of the lengthy market collapse. However, the timely, obligatory, and successful anti-epidemic measures taken by governments led to a positive performance of stocks. As a result, the COVID-19 contagion's impact on stock returns in the U.S. transformed from negative to positive performance.

Keywords: COVID-19; stock market; United States; descriptive statistic.

1. Introduction

The COVID-19 epidemic generated a sizeable unfavorable effect on the global stock markets. When the pandemic began in December 2019 in Wuhan, it only took two months to spread to over 190 countries quickly. The worldwide macroeconomic losses from this pandemic became incalculable, and the global financial market experienced dramatic fluctuations. COVID-19 amplified the negativity spread among international investors and contributed to the herding effect, leading to a subsequent stock market decrease and a downward spiral. For instance, the 11-year U.S. bull market that had been going on since 2009 ended when the stock market saw four mental breakdowns in only ten days [1]. Other significant economies with large stock markets, including the NAS100 index, also experienced a decline of up to 30%. As a result, it is vital to evaluate how the pandemic has inflicted the stock market. This article uses descriptive statistics to analyze the dynamic effects of the coronavirus outbreak on the S&P 500 index in the United States.

In the United States (U.S.), the coronavirus pandemic caused enormous volatility in the financial markets. For example, the S&P 500 Index, the United States' key financial and economic indicator dropped from around 3386.15 on February 19, 2020, to about 2237.40 on March 23, 2020 [2]. This corresponded to about 41% fall. However, the economy achieved a phenomenal rebound with figures such as 4,436.75 on August 10, 2021, smashing records. The pandemic significantly impacted financial markets as they were laid bare to substantial shocks [3]. The pandemic significantly increased risks and uncertainties in the U.S. stock market by the second week of March 2020. As a result of the dwindled rate, the S&P index started moving up about 7% daily and thus had to readjust by going down by 33.7% [4].

Stock market worldwide reported the largest one-week decline in the stock market in 2020 due to COVID-19 [5]. This was the largest decline since the 2008 financial crisis and was associated with price spillovers. In this case, price movements in other financial markets resulted from price changes in the S&P 500, which led to a market meltdown. The COVID-19 index caused heightened volatility and panic trading in a number of significant indices. [6]. The US S&P 500 was periodically terminated when it plummeted by at least 7% in March 2020. Notably, by the end of February 2020, the sell-off by investors and traders seeking to safeguard their wealth had intensified the volatility of the financial

markets. This, as a result, caused a crash in the equities markets and a loss of 30% of market capitalization. It was a signification of the U.S. market response to the arrival of COVID-19 and the beginning of a downward trend in the market.

The epidemic hurt the S&P 500 index, which was a risk to the stock exchange [7]. The heightened health risk raised risk aversion, thus negatively impacting the global performance of stock markets. COVID-19 made the volume of stock trades continually decline on the American stock market due to many daily case reports [8]. Thus, the general volatility of the financial markets appeared to be alarming investors. Apart from raising the risk to unprecedented levels, the COVID-19 pandemic caused investors to experience substantial losses within a short time. It indicated that COVID-19 had a strong adverse reaction to the stock market during the initial stages, thus leading to a sharp response.

The greater attention by investors to COVID-19 induced deleterious market returns [9]. These reactions contracted the attention theory, which predicts the existence of a positive reaction between intensified attention by investors and stock market returns. Attention theory insinuates that heightened attention by investors is likely to raise share prices, enhancing returns. However, the market performed contrary to the theory during the COVID-19 epidemic. The investors' intensified attention to an adverse shock caused a negative trend in financial markets.

The disruption in the stock market differed from one sector to another [10]. Thus, companies ranking in the S&P 500 insinuated differing economic consequences from one sector to another. In the manufacturing industry, for instance, most companies with global supply chains were significantly disrupted due to reduced global trade. Forecasts indicated that COVID-19 resulted in a 13%-32% downturn in goods trade and a 30%-40% decline in foreign direct investment in 2020. Besides, multinational businesses cut by one-third the amount they invest abroad. Foreign direct investments sometimes impact the stock market, whereby an increase in FDI by 1% causes the stock market index to decrease by 0.06% [11]. However, some studies indicate that FDI has no notable impact on the stock market. Notably, the Baltic Exchange Dry Index shows that transportation costs on various commodities in the international market are resistant to manipulation by speculators or government interference [12]. Thus, rather than the stock market, this has an impact on the demand and supply on the global market.

2. Method

2.1 Methodology

The study obtained a sample of 36 observations of S&P 500 data. The data was recorded once per month. We recorded the opening, high, low, closing, adjusted closing, and volume of the S&P 500. This paper used descriptive statistics and a line graph to show the trend of the stock. In descriptive statistics, we relied mostly upon the measures of dispersion and central tendency. In measures of central tendency, we selected the mean while in measures of dispersion we selected the standard deviation. A line graph is mostly used when measuring a continuous variable over time. In this case, we measured and plotted the S&P stock price and volume over time. The opening stock, high, low, close, volume, and adjusted close were all continuous variables. We used systematic sampling when selecting the observations whereby the prices, and volume were recorded for every first day of the month.

2.2 Data Description

Table 1 demonstrates that the mean returns from the open and close are very low. The high kurtosis indicates that returns of the S&P-500 indexes exhibit non-normal properties. The outcome of the M.S.E. test shows that there is no autocorrelation in the raw returns. The coefficient shows that the likelihood of an S&P 500 index falling increases for every additional COVID-19 infection variable. Consequently, the statistically independent observations might infer that the coronavirus had a detrimental impact on stock market values and distribution patterns. It can rule out the null hypothesis when the p-value is low (0.05). According to the empirical findings, a 1% rise in the total number of

daily coronavirus occurrences in the U.S causes the S&P 500 Index to decline by roughly 0.01% after a day and by about 0.03% after a week.

Table 1. Descriptive Statistics

	Open	High	Low	Close*	Adj Close*
Mean	3421.269	3568.861	3321.392	3477.89	3477.891
Median	3240.165	3365.645	3155.31	3250.37	3250.37
Std. Dev.	635.791	656.841	632.053	645.654	645.654
Jarque-Bera	3.1189	3.4853	2.6254	3.6010	3.6010
Kurtosis	2.0197	2.0065	1.9710	1.9544	1.9544
Skewness	0.5297	0.5623	0.4368	0.5717	0.5717
Probability	0.2103	0.2691	0.1751	0.1652	0.1652
Minimum	2476.96	2708.95	2191.86	2584.59	2584.59
Maximum	4610.62	4808.93	4560.00	4766.18	4766.18
Sum	123165.7	128479.0	119570.1	125204.1	125204.1
Observations	36	36	36	36	36

3. Results and Discussion

3.1 Trend in Stock Market

The COVID-19 outbreak had caused the S&P 500 index to lose by volume from March 2020. From the figure 1, the market was running smoothly before December 2019, which was the month the COVID-19 started. From January 2020, there was a destabilization of the market and it became unpredictable. There were months where the price was very high and would fall abruptly within a short period. The empirical results show that a 1% increase in the total quantity of daily COVID-19 incidences in the U.S results in a fall in the S&P 500 Index of about 0.01% following a day and of about 0.03% within a week. Stocks in industries like energy resources, food, pharmaceuticals, and software saw positive gains in the S&P 500 sample, while shares in sectors like petrochemical, real estate, amusement, and hospitality saw sharp declines. As figure 1 shows.

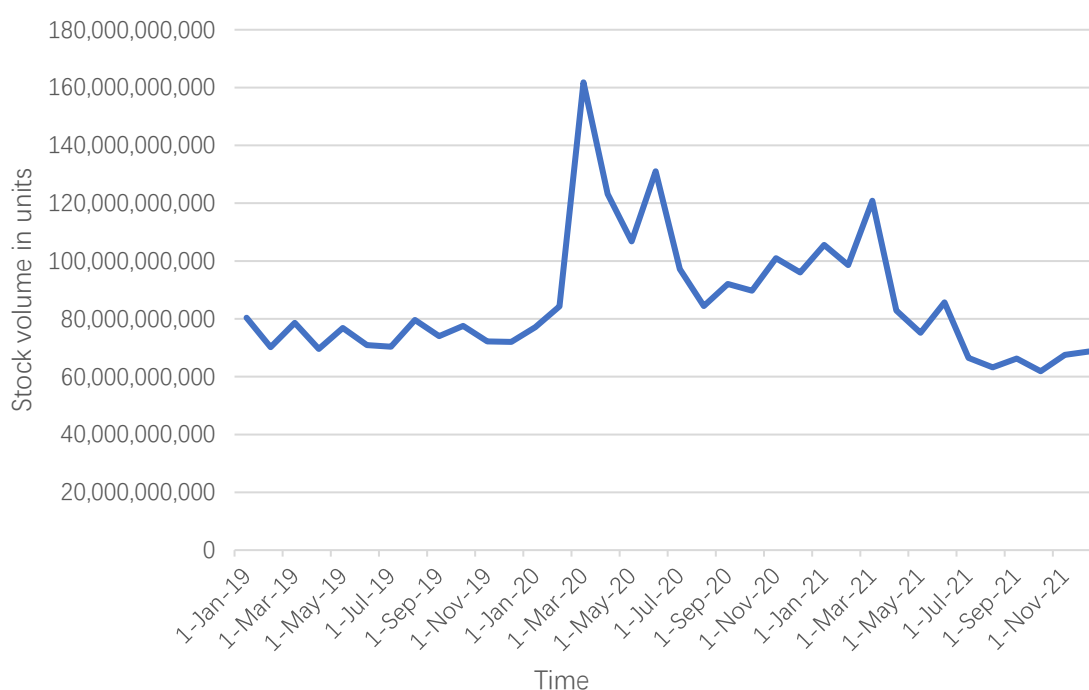


Fig. 1 Stock volume tend analysis

The historical breakdown of the S&P 500 Index reveals that most of the detrimental consequences of COVID-19 were seen in March 2020. A model is likelier to "fit" a dataset if the R.M.S.E. is smaller. A mathematical depiction of the similarity between a given data series and its delayed fluctuation over subsequent time frames is called autocorrelation. S&P 500 returns attentiveness is negatively connected with rising of COVID-19 infections. The seasonality data shows a trend that recurs every year. A time series is stationary when its median, covariance, and covariance are constant and independent of time. Based on how closely the data are spaced, the study may presume that the series is steady.

As shown in the descriptive statistics outcomes, the COVID-19 epidemic's propagation had a detrimental effect on stock macroeconomic factors at its commencement. The impact could be connected to the pernicious impact of the epidemic on financial markets, investor perceptions, and national monetary institutions. As an illustration, the COVID-19 pandemic resulted in the closure of businesses and factories in globally significant nations, leaving a production capacity gap. Additionally, there was a huge negative influence on the world's manufacturing systems, and the development of the domestic economic and financial system was severely constrained. Stock market returns, which are a leading indicator of the state of the economy, followed the aforementioned tendencies. The COVID-19 epidemic has caused the United States and other nations to sever trade connections because the United States is the center of the global economy.

The impact of the epidemic on stock returns is quite likely to exhibit repeatability in the US. The key determinants of this scenario in America entails the state of the economy. As illustrated in figure 1 above, since March 2020, the number of COVID-19 instances reported substantially increased, although the authorities gave it a little attention. The analysis above displays the empirical findings. First, there were apparent dynamic aspects to the COVID-19 pandemic shocks to various countries' currency rates. For instance, the ongoing pressure on the domestic macroeconomic variables progressively shifted from pressure on appreciation to pressure on devaluation.

Notably, domestic investment showed a pattern of outflow along with the escalating domestic epidemic within the United States. As a result, the U.S. dollar's rate of gain slowed, and devaluation pressure increased. Besides, there were different effects of exchange rate changes brought on by the coronavirus epidemic on stock market performance. The free-floating exchange mechanism was weakened as a result of the stock market's sensitivity to exchange rate changes. The ternary dilemma explains how the pandemic-related external unpredictability shocks were too many for the exchange rate floating mechanism to handle. Unrestricted cross-border market liquidity was therefore made possible. Notably, domestic money pours into the currency market, market liquidity is regained, and stock market gains decrease when the value of the home currency is under pressure to fall. Conversely, investors exhibit optimistic investing expectations and increase domestic returns when the domestic exchange rate is pressured. According to the empirical findings presented in this study, the negative effects of the epidemic on stock market caused a decline in returns over time.

From figure 2, the stock market returns quickly recovered and even increased after the international stock market crash from January 25, 2021, to Dec 2021. The improvement could be attributed to the improved national efforts at disease prevention and control, and the subsiding of investor concern was directly tied to this occurrence. Precisely, timely, obligatory, and successful anti-epidemic measures taken by governments had a significant regulatory element on the performance of stocks. Due to effective anti-epidemic measures, the coronavirus impact on stock returns in the U.S. changed from negative to positive.

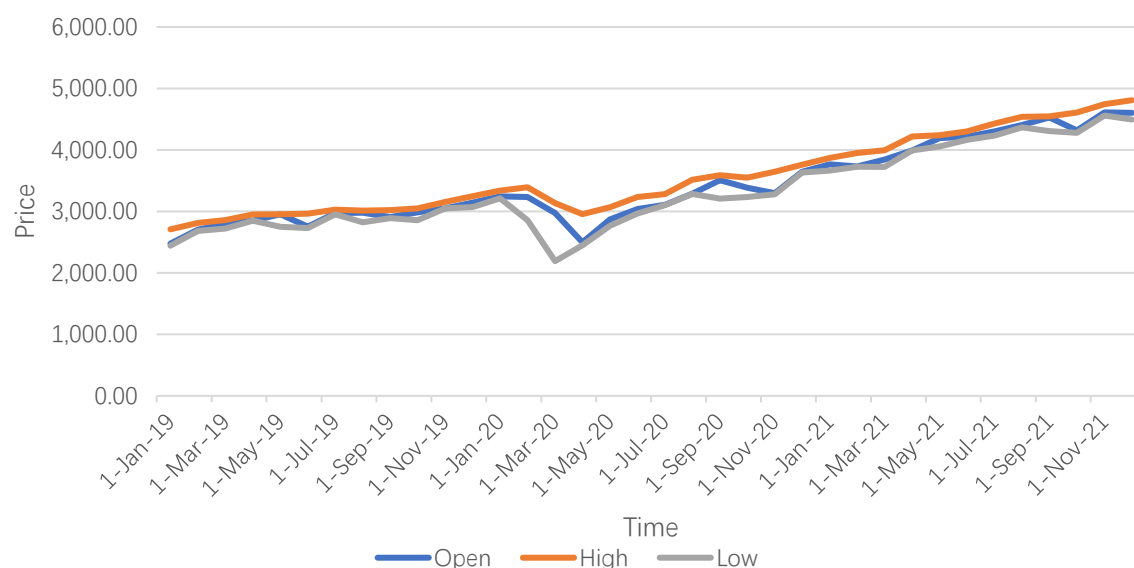


Fig. 2 Stock prices trend analysis

According to the interest rate parity theory, the market potential change and the exchange rate are fundamentally connected. The relationship between a nation's exchange rate and stock prices could be revealed by combining this theory with the Gordon model, which illustrates the relationship between the stock market and the cost of borrowing in the financial markets. The Dornbusch overshoot theory highlights the disproportionate asset market price response to external shocks due to exchange rate wave-off and expounds the disproportionate volatility of exchange rates. Historical evidence supports the validity of the cash circulation model and the asset allocation model, which correspondingly uses the capital account and the checking account as intermediates to explain the link between the exchange rate and stock prices.

The results indicate that the pandemic's spread has a significant detrimental impact on returns, but that effect diminishes as the time window is extended. Notably, anti-epidemic policy initiatives by government entities are the essential adaptation factors for stock returns. Also, As the transitional time gap in the analysis lengthens, the effects of the early stage of the epidemic on the stock market's trend eventually fade. As indicated in our analysis, the coronavirus adverse effects on stock returns decreased over time and recovered more quickly. Under the managed free-floating exchange, dividend yields changed in tandem with pressures on currency exchange recognition and depreciation. However, under the free-floating exchange rate regime, exchange rates rarely had an impact on stock market returns, but trade consequences did. Therefore, in order to lessen coronavirus detrimental effects on the financial markets, governments had to exert great efforts to raise the necessity and efficacy of epidemic prevention policies and tighten their control over exchange rate fluctuations.

The study reveal that the transmission of the coronavirus significantly reduces stock returns, but this effect is short-lived, and the stock market regenerates faster in the subsequent period. This however depends on whether the country's epidemic prevention policy is current and effective, and whether currency markets have a sequential impact on returns on stocks under controlled floating exchange rate system. Other researches focusing on pandemic's influence on financial markets can benefit from this quantitative study. This is because it shows the depth of the coronavirus strike on the stock market. Additionally, defining the traits and overarching principles of the impact and examining its routes of influence can aid in giving investors and policymakers a basis for decision-making and aid in resolving financial crises in their early phases.

4. Conclusion

This study employed descriptive statistics to examine the COVID-19 pandemic's time-varying effects on stock returns. The appropriate research outcomes have been enhanced and enlarged based

on prior literature. Particularly, the COVID-19 pandemic's spread has had a major detrimental influence on stock returns. This impact is time-varying, meaning that the degree of the damage varies depending on how long the time window is. The detrimental effects of the coronavirus on stock returns eventually diminished as the period got longer. For instance, as the temporal window was extended, the detrimental effect of coronavirus infections on stock market returns in the S&P 500 gradually diminished.

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