The Long-term Impact of Normalized Pandemic on Nasdaq and SP 500: An Empirical Evidence from Time Series

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Abstract. After Covid-19 pandemic, the global economy stagnated briefly and was deeply affected in the long-term. In the early days of the COVID-19 epidemic, the stock market was hit hard and stock prices fell sharply. The COVID-19 pandemic has brought turmoil to the global economy, and the implications are lasting and profound. Previous literature has highlighted the short-term impact of COVID-19 on stock and commodity markets. This study models the long-term dynamic response of the COVID 19 epidemic using time series. The VAR model was applied in the study to evaluate the link between variables, and the ARMA-GARCH model was used to determine and analyze stock volatility throughout the pandemic. Investors can easily recover from pessimism and reinvest in the market because the coronavirus pandemic has a huge short-term impact. However, long-term fluctuations in the US stock market are not significantly effected by the COVID-19 epidemic. The study forecasts the possible future of the U.S. stock market and provides managerial and investment recommendations to its stakeholders.

Keywords: Covid-19 pandemic, Stock returns, Stock return volatility, Time series.

1. Introduction

From the beginning of the 21st century to now, many public health emergencies have broken out in countries around the world, from SARS to influenza to the current COVID-19 epidemic. These outbreaks have had a serious impact on all countries. In addition to affecting global social stability, they have also had a serious impact on their economic development. Not only will public health crises put people's lives and livelihoods in danger, but they will also have a substantial negative influence on the economy, putting pressure on both the supply and demand sides. Meanwhile, public health emergencies greatly increase the pressure on income and expenditure, which will result in a continuous detrimental effect on both the national economy and the world economy in the long run, and greatly increase the uncertainty of the macroeconomic environment, which has caused several vicious loops. In this process, through industrial chain and other mechanisms, the impact on economic production is easily converted to the capital market, which will also lead to significant shocks in the financial market [1].

Following the release of the COVID-19 report in December 2019, COVID-19 went public and delivered an unprecedentedly high infection rate and ramifications globally, the world has been in a state of chaos and panic. The disease further fueled the uncertainty by drastically disrupting people's lives all around the world. Over one-third of individuals around the world were subject to lockdowns or closing times restrictions, which has led to panic buying, the shut down of enterprises, industries and educational institutions, as well as other phenomena that were unimaginable in the past [2].

So far, the COVID-19 pandemic, which has over 603957507 confirmed cases as of September 7th, 2022, has halted global real economic activity [3]. During the global health crisis, financial markets displayed a stunning price decline. The COVID 19 outbreak caused dramatic and erratic reactions in financial markets around the world. U.S. stock markets plunged after the coronavirus pandemic broke out in the country, which caused an unusual circuit breaker mechanism to briefly suspend trade in order to prevent panic selling. At the same time, stock markets around the world were responding sharply as well. The Japanese stock market evaporated over 20%, compared to the top it reached at the end of 2019 and the FTSE of the UK fell over than 10% on March 12th [4]. According to research

by Gormsen and Koijen, the equity markets have declined in relation to COVID 19 similar to what they did during the global financial crisis of 2008, yet they have recovered more swiftly, notably in Europe [5].

Previous studies discussed the COVID-19 effects were predicted to last until March 23, people are still unsure of how COVID-19 will actually influence emerging stock markets after the measures have been implemented. This study seeks to comprehend the long-term implications of the COVID-19 epidemic on the stock market because stock market offers an up-to-date account of what investors expect the COVID-19 pandemic's ultimate effects will be. However, only a few studies discussed how exactly the stock volatility of the stock market reacts to changes in the COVID-19 pandemic. To fill the void, this paper examines not only how the increase in confirmed cases in the US affects the US stock market in terms of stock volatility, but also how confirmed cases of COVID-19 around the world influence US stock market in regard to stock volatility. The article will also include a study of the ongoing implications of the COVID-19 pandemic on U.S. stocks and the specific reason for analyzing the relationship is to understand the fluctuation pattern of SP500 and NASDAQ indexes return after COVID19 started being contagious, and to provide relevant advice to investors and organizations. As a result, some irrational investments or strategies can be avoided.

Following is the organization of the remaining portions of this essay. Previous works on trend analysis for the stock market are discussed in Section 2. Information about the data source, data stability, and the models in this paper is covered in Section 3. Section 4 follows, with a thorough explanation of the findings from the ARMA-GARCH and VAR models, as well as additional analysis on the stock return, stock volatility, and market participants' behavior. Following that, there is a discussion on the study's focus, objective, and importance. Finally, Section 6 reiterates the final conclusion briefly.

2. Literature Review

The epidemic significantly affects the state of the economy, based on the Financial Stability Report. The worsening crisis could affect the stable world financial system [6]. The governments are frantically working to reduce the COVID-19 pandemic's negative health and economic repercussions [7]. Based on a number of assumptions, Wren-Lewis predicted that the COVID-19 pandemic would significantly affect GDP because it would reduce production and alter consumer desires. The epidemic will also make things worse if banks were unable to finance business because of a sudden drop in demand. This will finally result in the global stock markets collapsing [8]. According to Capelle-Blancard and Desroziers, who took into consideration the variability across many nations, stock market reactions were mostly determined by the number of affected individuals in each nation, and volatility increased as fears about the epidemic mounted. Individual stock market reactions vary depending on the pandemic's severity throughout different nations [9]. He rt al. examined discovered that short-term stock market outcomes are adversely affected by the COVID-19 pandemic. As the virus spreads, the greater the impact of the pandemic on Asian, European and U.S. stock markets [10]. According to Ashraf, the quantity of confirmed cases and the performance of the US stock market are inversely correlated. The author also concludes that the surge in mortality was overshadowed by the rise in COVID-19 confirmed cases, which had a bigger negative effect on stock markets. [11]. Wavelet technique was used by Goodell and Goutte to analyse daily data on COVID-19 related deaths around the world and daily Bitcoins prices [12]. The links among the COVID-19 epidemic, political risks, and the equity markets across time using a wave method were explored by Sharif [13]. Azimli using the quantile regression method to examine how COVID-19 affected the return-risk connection [14]. The significance of disaster bonds as a place of refuge for global equity, bond, estate development, commodities, investment management, and construction markets is examined by Drobetz et al [15].

The past literature has mostly explained how the COVID-19 epidemic has affected the stock and commodity markets in the short term and how the government might lessen the short-term losses

brought on by the outbreak. However, the long-term sustained influence of COVID-19 on US equity markets, has not been studied in prior work.. This paper mainly uses the S&P 500 and NASDAQ indices to reflect how the U.S. market perform, examines the long-term influence of the COVID-19 pandemic on the U.S. financial market specically securities market and gives investors and the government strategic suggestions for long-term response to the COVID-19 epidemic

3. Research Design

3.1. Data Source

The S&P 500 and NASDAQ indexes are mostly representative of the overall U.S. stock market. Therefore, the study's data extraction included the daily total of all confirmed cases in the US and worldwide and the closing prices of the S&P 500 and NASDAQ indices in the US between January 23, 2020 and September 7, 2022 from the Choice Financial Terminal. To determine the effect of increased new cases in the US and globally on fluctuations in S&P 500 and NASDAQ indices return, data processing is needed. To further explain, the daily growth in US and global new cases is expressed by subtracting yesterday's total confirmed cases from today's total confirmed cases. The returns on S&P 500 and NASDAQ indices are calculated by dividing the difference between the closing stock prices of two days by the closing stock price of the day before, and and the formula transforms the data ln(1 + x), continuing the logarithmic scale's examination. The missing data are not included in the study since there are certain total confirmed cases that are lost on particular days. Stata was used to analyze the data and create models for further investigation using the revised, corrected data.

3.2. Augmented Dickey–Fuller (ADF) Unit Root Test

Data stability is an indispensable prerequisite for modeling so the first step is to test whether or not the data are stationary. Based on the ADF test performed in Stata, although the p-values in Table 1 for SP500 and NASDAQ index is equal 0.9080 and 0.9615 respectively, the p-values for SP500 and NASDAQ return and daily new confirmed cases in the US and around the world all equal 0, which is considered statistically significant. These results provide sufficient evidence to refute the hypothesis that variable has a unit root. In other words, the data are stable and the hypothesis based on them is plausible.

Table 1. ADF test

Variables	t-statistic	p-value
	Index	
SP500	-1.212	0.9080
NASDAQ	-0.847	0.9615
	Yield	
SP500	-17.410	0.0000***
NASDAQ	-17.766	0.0000***
	New confirmed cases	
US	-13.269	0.0000***
Global	-13.125	0.0000***

3.3. Autoregression (VAR) Model

A work on linear stochastic difference equations served as the foundation for the application of the VAR model [16]. Before arriving to Sim’s well-known contribution to the use of VAR models, [17-18] research on the autoregressive nature employed for Tinbergen’s model [19] was conducted. The VAR model can be used to analyze the relationship between several variables without having to deal with the difficulties of building a model based on sound economic theory [20]. Although some analysis suggested that the SP500 and NASDAQ indexes were impacted by the Covid-19 release,

there is little evidence to support the notion there is a direct association between stock returns and increases in the number of daily confirmed instances. In this situation, the fourth VAR(p) model was created using the three independent time series variables designated by $x_{t,1}$, $x_{t,2}$, $x_{t,3}$, $x_{t,4}$

$$x_{t,1} = \alpha_1 + \varphi_{11}x_{t-1,1} + \cdots + \varphi_{1p}x_{t-p,1} + \beta_{11}x_{t-1,2} + \cdots + \beta_{1p}x_{t-p,2} + \delta_{11}x_{t-1,3} + \cdots + \delta_{1p}x_{t-p,3} + \gamma_{11}x_{t-1,4} + \cdots \gamma_{1p}x_{t-p,4} + e_{1t} \quad (1)$$

$$x_{t,2} = \alpha_2 + \varphi_{21}x_{t-1,1} + \cdots + \varphi_{2p}x_{t-p,1} + \beta_{21}x_{t-1,2} + \cdots + \beta_{2p}x_{t-p,2} + \delta_{21}x_{t-1,3} + \cdots + \delta_{2p}x_{t-p,3} + \gamma_{21}x_{t-1,4} + \cdots \gamma_{2p}x_{t-p,4} + e_{2t} \quad (2)$$

$$x_{t,3} = \alpha_3 + \varphi_{31}x_{t-1,1} + \cdots + \varphi_{3p}x_{t-p,1} + \beta_{31}x_{t-1,2} + \cdots + \beta_{3p}x_{t-p,2} + \delta_{31}x_{t-1,3} + \cdots + \delta_{3p}x_{t-p,3} + \gamma_{31}x_{t-1,4} + \cdots \gamma_{3p}x_{t-p,4} + e_{3t} \quad (3)$$

$$x_{t,4} = \alpha_4 + \varphi_{41}x_{t-1,1} + \cdots + \varphi_{4p}x_{t-p,1} + \beta_{41}x_{t-1,2} + \cdots + \beta_{4p}x_{t-p,2} + \delta_{41}x_{t-1,3} + \cdots + \delta_{4p}x_{t-p,3} + \gamma_{41}x_{t-1,4} + \cdots \gamma_{4p}x_{t-p,4} + e_{4t} \quad (4)$$

$$\begin{bmatrix} x_{t,1} \\ x_{t,2} \\ x_{t,3} \\ x_{t,4} \end{bmatrix} = \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \\ \alpha_4 \end{bmatrix} + \begin{pmatrix} \varphi_{11} & \cdots & \varphi_{1p} \\ \varphi_{21} & \cdots & \varphi_{2p} \\ \varphi_{31} & \cdots & \varphi_{3p} \\ \varphi_{41} & \cdots & \varphi_{4p} \end{pmatrix} \begin{bmatrix} x_{t-1,1} \\ \vdots \\ x_{t-p,1} \end{bmatrix} + \begin{pmatrix} \beta_{11} & \cdots & \beta_{1p} \\ \beta_{21} & \cdots & \beta_{2p} \\ \beta_{31} & \cdots & \beta_{3p} \\ \beta_{41} & \cdots & \beta_{4p} \end{pmatrix} \begin{bmatrix} x_{t-1,2} \\ \vdots \\ x_{t-p,2} \end{bmatrix} + \begin{pmatrix} \delta_{11} & \cdots & \delta_{1p} \\ \delta_{21} & \cdots & \delta_{2p} \\ \delta_{31} & \cdots & \delta_{3p} \\ \delta_{41} & \cdots & \delta_{4p} \end{pmatrix} \begin{bmatrix} x_{t-1,3} \\ \vdots \\ x_{t-p,3} \end{bmatrix} + \begin{pmatrix} \gamma_{11} & \cdots & \gamma_{1p} \\ \gamma_{21} & \cdots & \gamma_{2p} \\ \gamma_{31} & \cdots & \gamma_{3p} \\ \gamma_{41} & \cdots & \gamma_{4p} \end{pmatrix} \begin{bmatrix} x_{t-1,4} \\ \vdots \\ x_{t-p,4} \end{bmatrix} + \begin{bmatrix} e_{1t} \\ e_{2t} \\ e_{3t} \\ e_{4t} \end{bmatrix} \quad (5)$$

The equation (1), (2), (3), (4) above are for the SP500 indexes return, NASDAQ indexes return, daily new cases in the US and daily new cases globally, respectively, and equation (5) is expressed as matrix. To be clear, in equation(1), $\alpha_1 + \varphi_{11}x_{t-1,1} + \cdots + \varphi_{1p}x_{t-p,1}$ shows a linear function of SP500 indexes return lags in the past and $\beta_{11}x_{t-1,2} + \cdots + \beta_{1p}x_{t-p,2}$, $\delta_{11}x_{t-1,3} + \cdots + \delta_{1p}x_{t-p,3}$ and $\gamma_{11}x_{t-1,4} + \cdots \gamma_{1p}x_{t-p,4}$ represent past lags of NASDAQ indexes return, daily cases in the US and daily new cases worldwide. e_{1t} is the error term. As a result, the variable SP500 indexes and NASDAQ indexes are modeled using historical values for the variable and the other two variables. Similarly, the structures of the equations for the remaining three variables are the same, however, the coefficients and variable in the equation's left side are altered.

3.4. ARMA-GARCH Model

The ARMA-GARCH model can evaluate both the return an volatility of the SP500 and NASDAQ indexes. This study divides the model into the ARMA and GARCH portions.

$$y_t = \varphi_0 + \sum_{i=1}^{p} \varphi_i \, y_{t-i} + \alpha_i - \sum_{i=1}^{q} \varphi_i \, \alpha_{t-i} \quad (6)$$

The general expression of the ARMA model is displayed in equation (6). The AR(p) is represented by the component $\varphi_0 + \sum_{i=1}^{p} \varphi_i \, y_{t-i}$, and the rest of the equation is MA(q). AR(p) estimates future value applying past SP500 and NASDAQ indexes from January 2020 to September 2022, while MA(q) forecasts by using an error term.

GARCH is developed from ARCH fundamentally and both view volatility as a variance that needs to be modeled [21]. In this paper, GARCH (1,1) was taken into account, where the first 1 denotes one autoregressive lag and the second 1 denotes one moving average lag. The reasons for selecting GARCH (1,1) are as follows: it has fewer parameters than ARCH(p); it fits many time series well [22], it is sufficient to identity the volatility clustering in the data and it only requires one lag for analysis [23]. Therefore, the model GARCH (1,1) was chosen.

$$\sigma_t^2 = \alpha_{0,1} + \alpha_1 \varepsilon_{t-1}^2 + \beta_t m_t + \gamma_1 \sigma_{t-1}^2 \quad (7)$$

In the equation (6), term $\alpha_1 \varepsilon_{t-1}^2$ is ARCH part and $\gamma_1 \sigma_{t-1}^2$ represents GARCH part, and the additional term $\beta_t m_t$ other than the generalized formula represents confirmed cases that served as an extra explanatory variable in the model.

4. Empirical Results and Analysis

4.1. Order of VAR Model

The ideal lag sequence for a VAR model should be chosen after considering the LR statistic and other information criteria of each lag. An asterisk sign (*) appears after the data to signify the desired lag order.

Table 2. VAR model identification

Lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	853.242				6.3e-07	-2.91836	-2.90666	-2.88835
1	946.827	187.17	16	0.000	4.9e-07	-3.18497	-3.12648	-3.03492
2	973.498	53.342	16	0.000	4.7e--07	-3.22164	-3.11636	-2.95155
3	997.571	48.145	16	0.000	4.6e-07	-3.24938	-3.09731	-2.85925
4	1037.59	80.041	16	0.000	4.2e-07	-3.33193	-3.13306	-2.82176
5	1312.18	549.18	16	0.000	1.7e-07	-4.22056	-3.97489*	-3.59034*
6	1329.05	33.74	16	0.006	1.7e-07	-4.22354	-3.93109	-3.47329
7	1349.05	40.006	16	0.001	1.7e-07*	-4.2373	-3.89805	-3.36701
8	1355.79	13.474	16	0.638	1.8e-07	-4.20547	-3.81943	-3.21514
9	1375.84	40.105	16	0.001	1.7e-07	-4.21939	-3.78656	-3.10902
10	1397.19	42.688*	16	0.000	1.7e-07	-4.23776*	-3.75813	-3.00734
11	1400.81	7.2357	16	0.968	1.8e-07	-4.19521	-3.66879	-2.84475
12	1408.14	14.66	16	0.550	1.8e-07	-4.16541	-3.5922	-2.69492

Table 2 reveals that lags 5,7 and 10 all have that sign. A comparison of AIC differences is necessary to determine the optimal lag order. The difference in AICs between 5 and 6 is around 0.003, while the difference between 10 and 11 is approximately 0.04. As a result, lag 5 is the better option to begin with.

After specifying the order of the VAR model, it is crucial to determine whether the VAR model is steady. If the VAR model is non- stationary, the impulse-response function will not reach zero, showing that daily new confirmed cases have long-lasting effects on the return on the SP500 and NASDAQ indexes. Then, the model's applicability was assessed by running the unit root test and drawing a unit circle with the model's roots. In Figure 1, every root is visibly contained within the circle, indicating that the VAR (5) is a stable model and that there is no need to reevaluate the lag order.

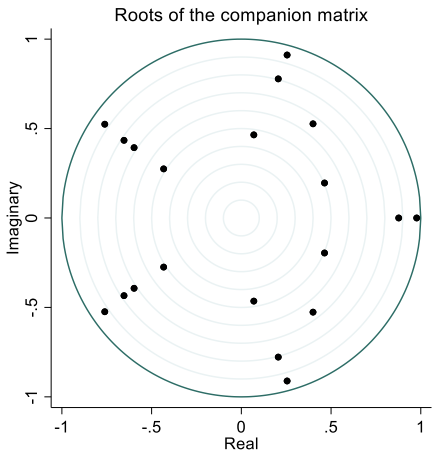


Figure 1. VAR stability

Photo credit: Original

4.2. Impulse Response

In this paper, investigation on how SP500 and NASDAQ indexes returns respond to new case impulses in the US and around the world was done. According to previous studies, a high level of policy uncertainty hurt stock market performance because participants or investors were pessimistic about the anticipated discount rate, which caused a drop in stock price [24]. Likewise, people were more worried about the future performance of the stock market, wherever they were, after the introduction of temporary COVID-19 policies such as physical limitations, travel restrictions and an increase in death. The high likelihood of benefit loss made many investors absolutely concerned. Consequently, massive capital flowed out of the financial market, causing in a cliff drop in the financial index at the beginning of the outbreak. Meanwhile, COVID-19 closures, which have stopped the real economy from functioning, have also reinforced the shock. Despite the deeper understanding of the COVID-19 epidemic, more long-term evidence is needed to determine whether the changing pattern will continue to be like a roller coaster, investors' s behavior will return to normal, or the influence will long-lasting.

Over time, both cumulative and new confirmed cases still increased at a faster rate, but the U.S. stock market did not show a more dramatic correction (Figure 2 & 3)

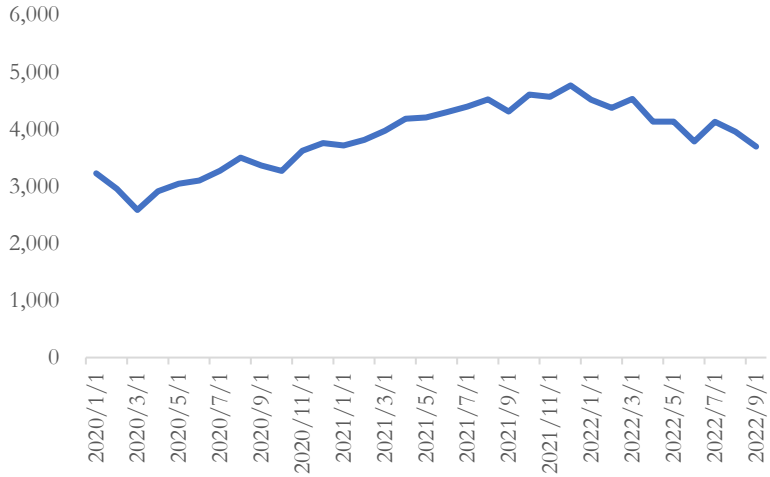


Figure 2. SP 500

Photo credit: Original

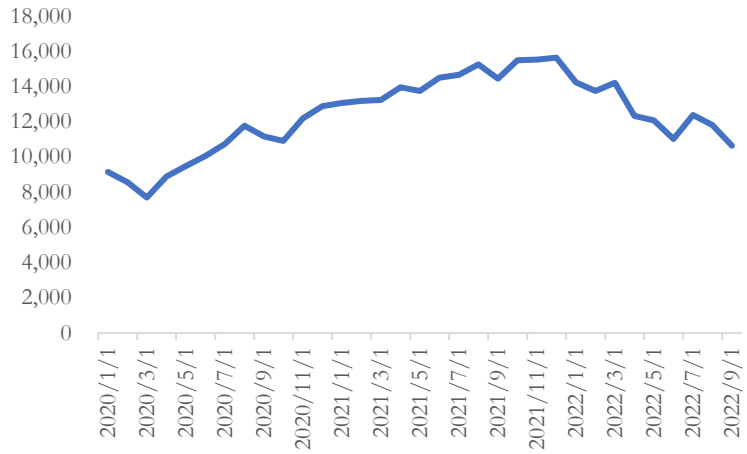


Figure 3. NASDAQ

Photo credit: Original

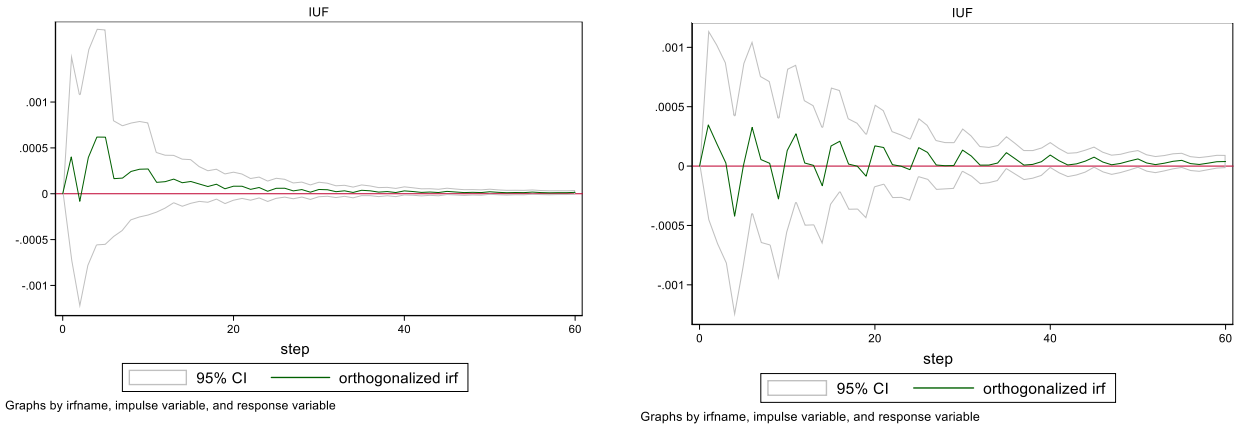
According to the impulse response function (Figure 4) derived from the VAR model in this paper, it can be found that in the case of a normal epidemic, the factors that continue to affect the operation of the stock market are more dependent on fundamentals, and investors seem to have accepted the basic fact that the epidemic will exist for a long time. Specifically, at time t=0, the stock market is no longer adversely affected by the rise in new cases in the US. However, the increase in new cases in the world affect the market in the long run. The return rate of the S&P 500 will vary around zero in the future if the volume of new cases climbs by 1% globally over the present timeframe, and the positive and negative effects will basically offset. In a similar way, as can be seen from the pulse plot with NASDAQ return rate as the response variable, the number of new confirmed cases worldwide increases by 1%, and the return rate in the future will also fluctuate around the value of 0, but the net effect is obviously negative. This paper argues that the possible reason is that NASDAQ is large and gathers a large number of multinational enterprises worldwide, and the rise in confirmed cases worldwide may affect the revenue of these enterprises. Finally, the COVID-19 pandemic will eventually have a dramatic influence on the NASDAQ market in the long-term, although it will be of a very minor order of magnitude.

One thing to note is that, although the COVID-19 epidemic affect the U.S. financial market, especially stock market in the long run, the effect is small. Accordingly, this paper argues that the U.S. financial market and COVID-19 have co-existed.

Impulse variable: New confirmed cases in US

Impulse variable: New confirmed cases, global

SP500



NASDAQ

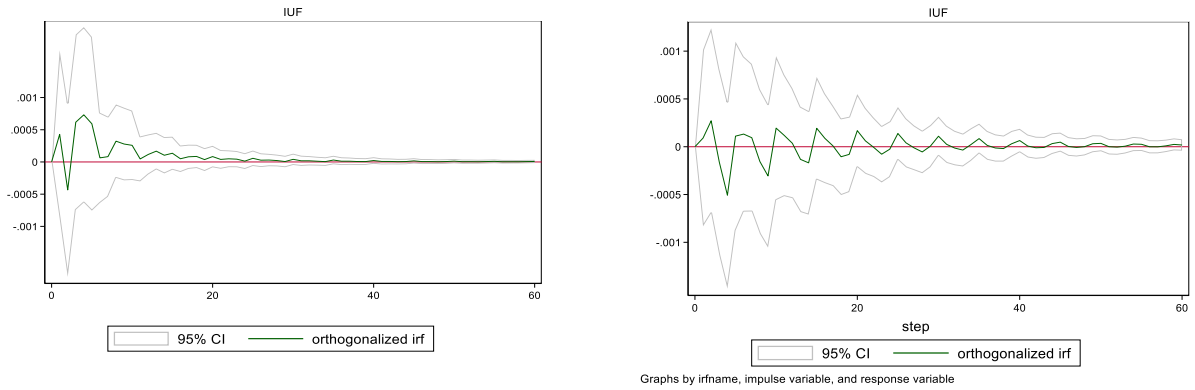


Figure 4. Impulse and response

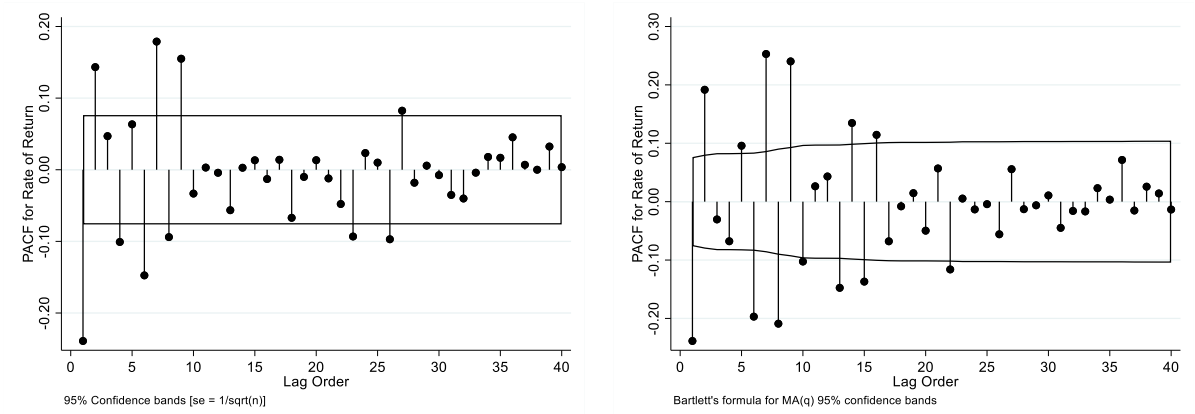
Photo credit: Original

4.3. ARMA (p, q)

Regarding to the order of the stock return in logarithm, PACF and ACF can be useful to derive the lag orders for AR(p) and MA(q). In the Figure 5, for both SP500 and NASDAQ indexes return, the first part beyond the critical values are 2 for both PACF and ACF plots, demonstrating that AR(p) and MA(q) both have order 2 and value of p and q are equal 2.

PACF ACF

SP500



NASDAQ

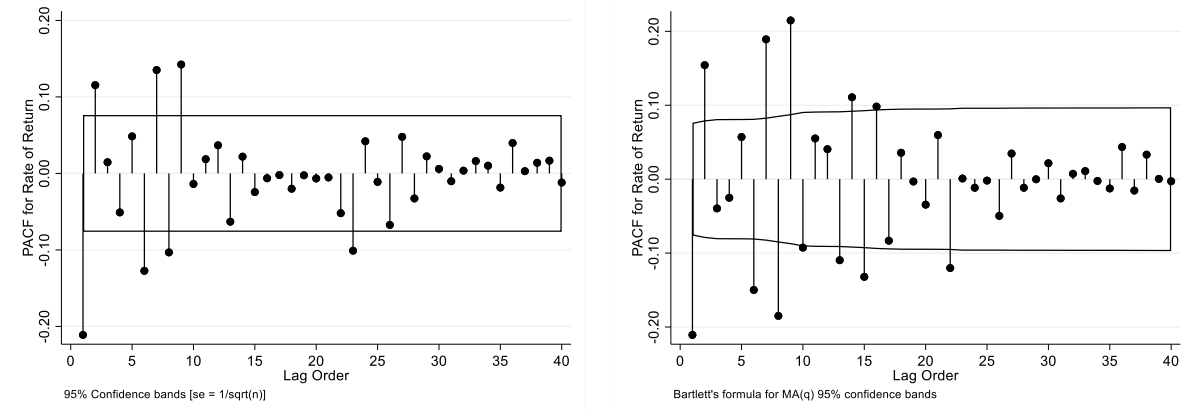


Figure 5. PACF and ACF

Photo credit: Original

4.4. ARMA-GARCH Estimation Results and Variance Equation

Implementing GARCH (1,1) is adequate to capture volatility clustering in time series, hence the ARMA-GARCH model was built.

Table 3 contains the model estimation findings as well as the variance equation. For SP500 and NASDAQ indexes return, the ARCH and GARCH terms in the variance equation both have p-values less than 0.05, showing that they are significant. Conditional heteroskedasticity satisfies the primary requirement of GARCH model construction, implying that the SP500 and NASDAQ indexes return have significant conditional heteroskedasticity. As can be seen from the estimation results of external explanatory variables, neither the estimated coefficients of the new cases worldwide nor the new cases in the United States are significant, indicating that over time, the US stock market's volatility is unaffected by the COVID-19 epidemic.

Table 3. ARMA-GARCHX estimation results

	(1)	(2)	(3)	(4)
	SP500		NASDAQ	
Mean Equation				
AR, L1	-0.5591	-0.5607	-0.5263	-0.5293
(p-value)	0.056	0.048	0.124	0.101
MA, L1	0.4730	0.4734	0.4505	0.4515
(p-value)	0.130	0.117	0.211	0.184
Constant	0.0008	0.0008	0.0008	0.0007
(p-value)	0.030	0.033	0.113	0.130
Variance equation				
New confirmed cases, daily				
Global	-0.0016		0.0105	
(p-value)	0.980		0.922	
US		-0.0485		-0.0151
(p-value)		0.148		0.771
GARCH (1, 1)				
ARCH, L1	0.2229	0.2110	0.1676	0.1682
(p-value)	0.000	0.000	0.000	0.000
GARCH, L1	0.7466	0.7602	0.8093	0.8078
(p-value)	0.000	0.000	0.000	0.000
Constant	-11.7643	-11.3361	-11.8383	-11.4445
(p-value)	0.000	0.000	0.000	0.000

5. Discussion

In comparison to other studies, this paper concentrates on how the return and volatility of the SP500 and NASDAQ indices are affected by the Covid-19 US and global new confirmed cases, whereas previous studies discussed the COVID-19 effects were predicted to last until March 23, people are still unsure of how COVID-19 will actually influence emerging stock markets after the measures have been implemented. Although some articles investigate stock market performance during the pandemic, their conclusions and topics are more related to big industries such as communication services, technology, healthcare, energy, and so on. However, one similarity between us in analyzing stock market volatility is that many authors adopted methodology or related transformations such as VAR model, GARCH model, TGARCH model, EGARCH model, or others in their research to determine stock market movements.

Through this paper, the effect of public health emergencies on stock markets diminishes over time. To reduce the damaging effects of public health emergencies on the economy, policymakers can develop pertinent policies based on their effects. Investors could pay more attention to designing

contingency strategies for the emergence of potential public health emergencies in order to make a rational investment decision, as well as taking a broad view to judge the likely duration or possible normalization of events. Additionally, it provides important implications for those monitoring the US stock market in the COVID-19 timeframe.

6. Conclusion

The objective of this study is to ascertain how new cases of the coronavirus epidemic correlate to stock market return and volatility, with an emphasis on the SP500 and NASDAQ indexes. The VAR and ARMA-GARCH models are introduced for this purpose, with the VAR model exploring impulse response and the ARMA-GARCH model assessing stock returns and conditional variances. The study comes to a conclusion after conducting empirical investigation.

Finally, this paper reveals that although the COVID-19 epidemic affects the U.S. financial market, especially stock market in the long run, the effect is small. Accordingly, this paper argues that the U.S. financial market and COVID-19 have co-existed. In other words, the stock market's reaction to COVID-19 was a brief huge shock rather than a sign of a long-lasting huge influence. Following the general trend of stock market, the impact on the long-term future of the stock return and its volatility will eventually fade and return to normal. One conclusion can be drawn is that the impact of public health emergencies on stock markets diminishes over time. It is necessary for the government to actively introduce relevant policies in the short term to reduce the losses caused by public health emergencies at the beginning. For investors, it is important to reduce their asset allocation in the equity market at the beginning of the outbreak of the public health emergencies, and increase their asset allocation in the stock market after the influence of the public health emergencies decreases over time.

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