International Journal of Social Science And Human Research

ISSN(print): 2644-0679, ISSN(online): 2644-0695

Volume 05 Issue 08 August 2022

DOI: 10.47191/ijsshr/v5-i8-69, Impact factor- 5.871

Page No: 3913-3925

The Impact of Covıd 19 on the Volatılıty of Stock Market Returns

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ABSTRACT: With the support of a generalized autoregressive conditional heteroscedasticity model, this research experimentally examines the effect of COVID-19 on the volatility of stock prices in 3 different stock indexes. The analysis used daily closing prices from May 31, 2012, through May 31, 2022, for stock indices tracked by Euronext and SSE. Additionally, the study aimed to compare the market price return between the pre-pandemic and after situations. According to the findings, the stock markets in China, Europe, and the S&P 500 all experienced volatility during the pandemic period. We discovered that the return on the indices was higher in the pre-COVID-19 period than it was in the pandemic period when comparing the results of the disease period with those of the pre-COVID period.

KEYWORDS*:* Stock indexes, volatility, structural breaks,

1. INTRODUCTION

Indexes react quickly to news. Natural disasters (Lee & Chen, 2020), news announcements (Hussain & Ben Omrane, 2020), major sporting events (Curatola et al., 2016), environmental events (Guo et al., 2020), unexpected political shocks (Hillier & Loncan, 2019), and terrorist attacks are a few events that impact stock market returns (Goel et al., 2017). Ichev and Marin (2018) say stock market indices may react to pandemics like Ebola and SARS (Chen et al., 2007). No one seems to have studied how pandemics affect stock indices. Location and early media terminology gave "Wuhan pneumonia" symptoms resembling pneumonia. Complete genome sequencing revealed a new coronavirus as the culprit. This is the fifth human coronavirus.

The WHO named the novel coronavirus on January 12, 2020, and coronavirus illness 2019 on February 12, 2020. The International Committee on Virus Taxonomy gave this virus the name X based on phylogeny, taxonomy, and epidemiology. SARS-CoV-2. Natural disasters, market crises, diseases, and wars have all demonstrated this to humanity. first found during the COVID-19 epidemic in Wuhan, China. It emerged in December 2019 and has spread to almost every country. No devastating epidemic has ever struck humanity. As the number of cases grew, countries took strict steps to stop the virus from spreading.

Lockdown, social isolation, and suspension of domestic or public activities International travel, tourism, export, import, and restrictions on the movement of people and things have disrupted the supply chain and harmed the economy (Ceylan et al., 2020). A pandemic destabilizes the global economy. She uncovered longstanding financial regulation dysfunctions. The bulk of countries' containment efforts have hampered the global operation of all financial components. Favorable investor behavior and market supervision authorities' financial institutions' regulation and investor awareness have influenced global economic crisis management. This research analyzes the stock market's response to COVID-19. Using daily COVID-19 confirmed cases and fatalities data from May 31st, 2019 to May 31st, 2022, we discovered that stock markets responded negatively to the increase in COVID-19 confirmed cases. Stock returns declined as verified cases rose. Stock markets responded more positively to verified cases than deaths. Our data shows that stock markets respond quickly to the COVID-19 epidemic, and this response alters over time. We used the GARCH model to take into account expected volatility (measured in logs) and changes in transaction volume (also measured in logs).

My findings show that the number of dying and confirmed cases affects conditional heteroscedasticity in the S&P 500 indexes. The SS&P 500 deaths linked to this pandemic are being examined. Textual analysis should be used to calculate COVID-19's impact on market volatility. Analysts say this product had a higher impact on stock market volatility than its competitors'. This includes Ebola. First study of daily reported data COVID-19 incidence and fatalities affect conditional mean and volatility.

The D J Industrial Average is an index of the stock market. Consider the following requirements as well. Public opinion has been influenced by reports of occurrences and deaths in the United States and China. The Industrial Production Index will have increased by approximately 12% by March 16, 2020. However, none of the theories adequately explain the extraordinary volatility. During specified time periods, there is a great deal of economic and political interest, which is denoted by the phrase "high volatility."

In March 2020, the United States government implemented various market-stabilizing evaluations. According to Gormsen and Koijen (2020), economic support programs announced on March 13 and a fiscal stimulus package unveiled on March 24 failed to increase short-term growth forecasts. Changes in COVID-19-related illnesses and deaths have an impact on the Dow Jones and S&P 500, even when they occur in countries other than the US, according to researchers at the University of British Columbia (UBC) and the Canadian Institute for International Mining and Metallurgy (CIM).

When conditional volatility changes are considered, however, there is no indication that they have affected stock returns. In addition, in the final week of February 2020 volatility forecasts and stock market performance will undergo a regime transition. After the worldwide financial crisis, numerous governments imposed partial or complete lockdowns, limiting or halting economic activity. The fact that COVID-19 hurts the performance of growing markets shows that it hurts the global economy.According to the news, the stock markets have also been falling, which is troubling because it indicates a country's economic woes. Several industries and enterprises, including agriculture, construction, education, textiles, tourism, transportation, and oil and gas, have been badly damaged. As a consequence of the outbreak, economic activity has ceased.

In spite of the pandemic, industries such as healthcare and online services are thriving. As can be seen, the world has been affected by numerous diseases, but the world's economy and stock market returns have maintained their lowest levels because no one was aware of the fluctuating stock price throughout the lockdown. Does this pandemic have a consequence on the returns of the stock market? Does the significance of aberrant stock returns one and two days following the covid 19 pandemic announcements exist? Exists a relationship between stock market performance and stock indexes?

This study investigates the relationship between the outbreak and the stock market, as well as the impact on numerous countries based on when they were affected. This is to determine whether the states share or have comparable patterns of behavior. Due of their various stock markets and trading patterns, the pandemic has an effect on them. This study has a substantial impact on investors, governments, businesses, and enterprises.

Individuals will gain from it because it will not only keep them abreast of stock market events but also help them save money. They will be able to better plan and make more prudent financial decisions. In addition, firms might utilize this as a planning and decision-making reference. Because the epidemic is still ongoing, the thesis only covers the first quarter of the pandemic, and numerous changes may result from the discoveries made in the latter stages of the pandemic, this investigation will serve as a catalyst for future research and contribute to the conceptual development of individuals.

Because the world is so vast and the virus has spread to more than 193 countries, it would be difficult to analyze each one independently. As a result, we choose SSE,Euronext,SandP500 stock indexes from (China,Europe,US). This choice was made in order to gain a deeper understanding of the pandemic, beginning with its beginnings (China) and extending to countries such as the United Kingdom and the United States, which were afflicted later.

The United States of America was chosen since it is one of the economic superpowers of the globe. Spain and Italy were the top two countries. However, due to the language barrier, it seemed more possible to travel to the United Kingdom instead. Aware that the outbreak is still ongoing, the thesis concentrates only on the numerous changes that could result from the pandemic.

2. LITERATURE REVİEW

Multiple international monetary organizations and forums have issued warnings that the recent COVID-19 will likely have more of an impact on the world economy than the global economic crisis of 2007–2008. The World Economic Forum claims that the worldwide coronavirus shock is significantly worse than the Great Financial Crisis of 2007–2008 (2020, page 1).

The literature claims that COVID-19 had a significant effect on world financial markets. Several international financial markets have shown signs of the COVID-19's impact on the financial system. The movements in the Dow and S&P 500 trading rates have significantly flattened out in reaction to the COVID-19 scenarios in the United States and around the world. By day's end, the Dow and S&P had reached their highest single-day levels. e 1).

They are certainly working to reduce the consequences of the coronavirus pandemic. Economists predict that COVID-19 will have a significant economic impact. Analysts predict that the COVID-19 will have an impact on the economy and social welfare, particularly on financial market trading and on everyday business in terms of import and export, output, and fuel prices. Therefore, the essential actions taken to stop the pandemic's spread will have a significant impact on both the economy and general well-being, according to Schambaugh (2020, p. 1). All international financial markets have recently been impacted by COVID-19, which has led to a sustained and sizable decrease in share prices. Nikkei, a stock traded on the Tokyo Stock Exchange, Is an example of how financial markets. The Nikkei market price has been volatile ever since COVID - 19 first appeared and spread worldwide, with the majority of share values falling. The Daily FT claims that during the previous several days, the Nikkei, which monitors stock values on the Tokyo Stock Exchange, has also fallen precipitously (2020, pg. 1). The world's financial markets might close as a result of the COVID-19 epidemic, which would cause share prices to drop sharply. The COVID-19 has altered financial markets in a number of ways and will eventually have an effect on the world economy. Colombo stock markets in particular have seen firm closures and significant share price drops.

The Daily FT reports that the Colombo Stock Exchange has had to halt trading three times this week as a result of a drop of

more than 9% in its All Share Price Index over the previous week (2020, pp. 1) Numerous analyses predict that the current COVID-19 will have a significant effect on the world economy, which is on the verge of a global recession. When global output declines and job losses follow, the situation is referred to as a "global recession." This implies that there will be a decrease in industry output, job losses for people, and damage to import and export procedures on a global scale. A global recession is now a significant prospect; central banks globally, according to Euro New (2020, p. 1) have historically low interest rates. Literature has emphasized how the present COVID-19 epidemic has affected the financial markets. Experts claim that the financial markets have abruptly changed course and that COVID-19 is rapidly becoming pandemic as it travels around the world. The financial markets' response to the crisis will cause the world economy to slip into recession, according to COVID-19.

"These first results imply that the market began to react to concerns about the possible economic repercussions of the new coronavirus quite quickly," said Ramelli & Wagner (2020) firmly. The effects of COVID-19 on banks and financial markets have been thoroughly addressed by Baret et al. (2020). As the globe has recently witnessed the decrease of shares, oil, equities, and bonds, Baret et al. (2020) assert that the COVID-19 has substantial effects on the international financial markets. This indicates how the COVID-19 has significantly influenced the financial markets and investors' choices. According to Baret et al. (2020), since February 21, 2020, bond rates, oil prices, and stock prices have all increased, and trillions of dollars have moved to safer havens worldwide.

It will be challenging to rebuild and restore the economy because COVID-19 will have a significant impact on it, possibly greater than the financial crisis of 2017, according to a number of international organizations. To overcome the COVID-19 economic impact, the world community will need to be strong and united. "It is clearly evident that the impact on global economic activity from steps to control the spread of the corona virus pandemic would be severe," said an S&P Global assessment (2020, pg. 1). The corporate world has also been impacted by COVID-19. Revenue has reduced as a result of lower output experienced by many firms.A Black Swan Hypothesis

An incident known as a "Black Swan" is one that, with very few exceptions, could not have been foreseen by the witnesses. A Black Swan is an outlier—a value or number that differs from the rest of the data—in econometrics and statistics (Newbold, 2013). Taleb (2007a) ties all life-changing events to randomness and uncertainty throughout his book, as well as to our incapacity to foresee these occurrences, even by so-called "experts," and to our consistent reaction to these events (surprise). The basic premise of The Black Swan, according to the author, is the all-too-common logical conflation of the absence of evidence with the absence of proof (Taleb, 2007b).) A Black Swan, in Taleb's view, is more than just an incident. It includes both the absence of an anticipated and the existence of an unanticipated event. One of the three variables is unpredictable, with major influence being the other. potential theory

The Prospect theory, which argues that investors set and decide the portfolio under risk, was developed by Kahneman and Tversky in 1979. If an investor prefers investments with specific risk prospects in specific expected value, researchers advise that they should avoid risk. Prospect theory explains the negative association between risk and return by focusing on the peculiarities and behavior of risk-averse investors. This phenomenon was also validated by Barberis et al. (2016) and Beale et al. (2019). As a result, the phenomenon of stock returns and its widespread negative association can be explained by prospect theory. The purpose of our study is to assess how the financial markets behaved during the epidemic and contrast the evidence with that from before the outbreak, based on the literature and theoretical foundation indicated above.

Hypothesis

H1: The COVID-19 epidemic is inversely correlated with stock returns.
H2: The number of fatalities and infected cases has had an impact on the stock indices (Euro Next, SSE, SandP500).
H3: The trade volume, volatility expectation, and the covid 19 are correlated.
H4: there is a connection between stock price and volatility

3. DATA METHODOLOGY

The third section of the paper describes the research methodology, the data source and kind, the theoretical framework, the model formulation, and the approaches and techniques used to analyze the data. In addition, it describes how to build, assess, and interpret the appropriate method.

3.1 Research Design

A research design is a plan for data collecting, measurement, and analysis. A research design, according to Mugenda (2009), is a detailed strategy explaining how a particular study will be undertaken. The study design phase entails the formulation of a strategy and structure for the assessment procedure used to collect data pertinent to the research objectives. The plan often incorporates the complete academic program or project. A research plan is a strategy for fulfilling the study objectives, as stated by Bogdan and DeVault (2015). As a research strategy, a descriptive analysis was employed in this study. Rijbarova (2005) defines descriptive research as a technique for determining the presence of a connection between two or more natural variables. The research design was assessed to ensure that as little bias as feasible was introduced into the framework information collection process.

3.2 Population of The Sample

The entire group about whom you seek to draw conclusions is known as a population. A sample is the group from whom data will be collected. The sample size is always smaller than the size of the overall population, which in research does not typically refer to humans. It may refer to a collection of concepts from any field of study. Using the Shanghai Stock Exchange as a representative sample for China, the New York Dow Jones as a representative sample for the United States, and Euronext as a representative sample for the French stock market, the study investigated the influence of the COVID -19.

3.3 Data Collection

Secondary data consists of information derived from previously collected data or data produced by others. The technique for gathering information is straightforward and expedient; sources include books, websites, government publications, journals, articles, and archives. It is relatively inexpensive to acquire or obtain, requires less time, and the data is already optimized (S. 2017). In this study, secondary data were analyzed for the current investigation. The secondary data facilitated the creation of the investigation's baseline information. The survey will cover roughly ten years between 2012 and 2022. Corporate websites and Thomson Reuters offered secondary data.

Data Analysis After collecting the data, it was sanitized to verify its accuracy and chronological order. Following this section, descriptive statistics, correlations, and regression analysis were used to assess the association between the effects of covid 19 and the volatility of stock market return volatility. The study was completed using the STATA tool. Using stock market returns as the dependent variable and Volume, Daily news Covid 19 cases confirmed, Growth in daily News Covid 19, Book value, Turnover value, and Exponential growth Rate as independent variables. It utilized the chow test, The Chow test enables us to determine if the regression coefficients of each regression line are equivalent. If the test shows that the coefficients between the regression lines are not equal, this indicates that there is strong evidence of a structural break in the data.

3.4 Forecasting Volatility Models

A stock, index, currency, option, or comparable asset's future volatility is predicted using a variety of approaches and models. This thesis will discuss some of the more popular models in this part. Most volatility forecasting models fall into one of two categories: time series-based forecasting models or option-based forecasting models. Prognosis based on options Time series forecasting models employ historical data as the basis for their predictions. Other approaches are more intricate and advanced models. Nave models are typically described as models that only use past data.. Because they are time series forecasting models that assume the variance of the present data, ARCH family models are distinctive in that The size of the error term is proportional to the error terms from earlier eras. We will discuss the Garch model in this thesis.

3.5 Structural Break Test

It is well knowledge that the model's parameter stability condition must be met to avoid misleading inference and produce stable projections. For instance, Stock and Watson (1996) demonstrate that a considerable proportion of macroeconomic time series models exhibit severe instability. Under the assumption of equal variance, the Chow test is used to detect a structural break.

H0: $\alpha 0 = \beta 0$, $\alpha 1 = \beta 1$, $\alpha 2 = \beta 2$, $\alpha 3 = \beta 3$

H1: $\alpha 0 \neq \beta 0 \mid \alpha 1 \neq \beta 1 \mid \alpha 2 \neq \beta 2 \mid \alpha 3 \neq \beta 3$

If H0 is rejected, one may argue for a structural break. At least one of the equations in H0 do es not hold according to our study. A structural break could be claimed if H0 is rejected; however, we lack sufficient evidence to proclaim a structural break in the data if the null hypothesis is not rejected. In this instance, we propose that the regression lines can be "combined" into a single line that adequately represents the data pattern.

3.6 Generalized Autoregressive Conditional Heteroscedasticity (GARCH)

Tim Bollerslev expanded and introduced the GARCH model in 1986. (Bollerslev, 1986). Nonlinear models for variance were available prior to ARCH models. The rolling standard deviation method, which determines the standard This premise looks dubious. Given that later data observations should be given more weight, it is alluring. In addition, GARCH is a weighted average of preceding squared residuals, but the weights are continuously decreasing until they reach zero. The best variance estimate for the forthcoming period, according to our model, is the weighted average of the long-term typical variance (Engle, 2001). This model is highly-liked because it works well with many different data sets. It implies that the system has momentum in addition to volatility that fluctuates in response to lagging shocks. It can capture very long shock delays with just three parameters.

The model can be represented by a mean equation and a variance equation, which will be used and demonstrated later in the text. The GARCH model, which incorporates a background assumption of time-varying conditional volatility, effectively depicts volatility clustering in financial time series. The GARCH structure, on the other hand, has implementation issues because it needs a lot of observations to obtain accurate estimates, and it does not properly account for skewness and kurtosis. The majority of GARCH-type At increasing degrees of complexity, models offer a more reliable solution and improved efficiency.

Table 1. List of Variables

Variables	Description	Expected Return
Close	Daily Stock Price	Négatif
Conf cases	Daily Confirmed cases	Négatif
Conf death	Daily confirmed death	Négatif
GDP	Gross Domestic Product	
Turnover		
Vo	Volume	Négatif

4. RESULT AND DISCUSSION

This chapter contains the study's results and analyses. The section will begin with descriptive statistics of selected stock market return variables. Second, the unit root results for the various variables will be discussed. Finally, the outcomes of the Summary regression and regression analysis models will be displayed.

Table 1. Regressions Analysis During Covid 19

Source	**SS**	**DF**	**MS**
Euronext			
Model L	433,6566	6	72,2761
Residual	1300,34	19	68,4391
Total	1734	25	69,36
SSE	**SS**	**DF**	**MS**
Model	612,24	6	102,040
Residual	1296,42	20	64,821
Total	1908,666	26	73,410
SandP			
Model	191,581	4	47,89
Residual	1542,418	21	73,448
Total	1734	25	69,36

SandP	**SSE**	**Euronext**
Number of obs :26	Number of obs=26	Number of obs=26
F (4,21): 0,65	F:(6,28) =1,57	F:(6,19) =1,06
Prob >F: 0,6318	Prob >F = 0,2062	Prob >F = 0,4219
R-squared= 0,1105	R-squared = 0,3202	R-squared = 0,2501
Adj R-squared= -0,0589	Adj R-squared= 0,117	Adj R-squared=0,0133
Root MSE= 8,5702	Root MSE= 8,0512	Root MSE= 8,2728

Euro Next	**Coef**	**Std**	**T**	**P(T)**	**95 Coef**	**Interval**
Turnover	-0.4553	0.4030	-1 .13	0.273	-1.299	0 .388
Returns	0,2012	0,5063559	0,40	0,695	-0,9585	1,2610
GDP	-0,3177	1,3550	-0,23	0,817	-3,153	2,5184
Volume	0,04585	0,47314	0,10	0,924	-0,9444	1,0361
Confirmed death	-0,0000	0,000	-1,08	0,292	-0,000	0,0000
Confirmed cases	5,94	4,76	1,25	0,228	-4,03	1,59
Cons	25,84004	8,17262	3,16	0,005	8,7345	42,94
SSE						
Turnover	-0,586997	0,2110827	-0,28	0,784	-0,499	0,381611
Returns	0,141	0,4763214	0,30	0,770	-0,852	1,1345
GDP	-1,006	0,808774	-1,24	0,228	-2,69	0,6802419
Volume	0,211	0,2271	0,93	0,363	-0,2622	0,685
Confirmed death	0,006	0,003	1,92	0,069	-0,000	0,0131

Confirmed cases	-0,0000	0,000	-0,66	0,515	-0,0003	0.00
Cons	-2,1352	8,7554	-0,24	0,810	-20	16,128
SandP						
Returns	1,1829	0,5144	0,031	0,031	-0,00521	2,24
GDP	-1,54	0,585	-2,63	0,015	-2,7553	-0,3266
Confirmed death	-0,0013	0,001	-0,76	0,457	-0,005	0,002
Confirmed cases	0,0428	0,215317	0,215	0,844	0,403	0,489
Cons	19,57	4,63	4,22	0,000	9,95	29,19

Since at least one of the equations of the null hypothesis must be true, it is impossible to argue for a structural break. The simple hypothesis is supported. That would be just right. It is debatable whether trading was the primary source of income. It facilitates grasp of the topics raised. Before the end of 2019, more structural testing reveals a fracture. Other causes are believed to have caused the structural failure. basis for a potential structural breakdown; yet, based on our 26 observations, F (6, 19) equals 1,062. The R-square of this pooled regression table is 0.25 percent, the Adj R-square is model and assumption, and "Prob>F" for the euro is 0.4219 percent.

Table 2. Regression Analysis Pre covid 19

Source	SUM of square	DF	MS
SandP 500			
Model	58035,70	2	29017.85
Residual	6847.2938	89	76.9358
Total	64883	91	713
Euronext			
Model	25.232	4	6308.0773
Residual	39650,69	87	455,7550
Total	64883	91	713
SSE			
MODEL	16154	4	4038.68644
RESIDUAL	48382.2432	86	562.58422
TOTAL	64536.989	90	717.077

SandP	**SSE**	**Euronext**
Number of obs: 92	Number of obs=92	Number of obs=92
F (4,86):7,18	F:(2,89) =377,17	F:(4,87) =13,84,
Prob >F: 0,000	Prob >F = 0,000	Prob >F = 0,3889
R-squared= 0,2503	R-squared = 0,8945	R-squared = 0,3606

Euronext	**Coefficient**	**STD**	**T**	**P(T)**	**95 conf**	**Interval**
Volume	0,6492	0,1195	-5,43	0,000	0,88692	-0,411
Turnover	0,401288	0,154546	-2,60	0,011	-0,7084	-0,941066
Returns	-0,353	0,510	-0,69	0,490	-1,368	0,6605
GDP	-2,1404	1,7724	-1,21	0,230	-05,66	1,3824
Cons	111,0907	25,14642	4,42	0,000	61,10948	161,0719
SSE						
Returns	-0,358	0,321	1,11	0,268	-0,2810	0,9982
Turnover	0,6790	0,1086	0,63	0,533	-0,14799	0,2838
GDP	0,7080	1,5361	-0,46	0,646	-3,7617	2,345585
Volume	0,4190558	0,112289	3,73	0,000	0,1958	0,642227
Cons	22,41557	11,67059	1,92	0,058	-0,7847882	45,61593
SandP						
Returns	0,072	0,034463	2,11	0,038	-0,004	0,1411
GDP	0,9952	0,03649	27,27	0,000	-0,92272	-1,0677
Cons	-1,1758	2,4134	-0,627	0,627	-5,9711	1,6195

Adj R-squared= -0,2154 Adj R-squared= 0,8921 Adj R-squared= 0,3608

Root MSE= 25,719 Root MSE= 8,7713 Root MSE= 21,348

A structural break cannot be argued since at least one of the equations underlying the null hypothesis must fail. The null hypothesis does not fail to be rejected. That would be perfect. It is questionable whether trading was the principal source of income. Facilitates comprehension of the issues that are being discussed. Using additional structural tests, a crack is detected before the end of 2019. It is believed that other circumstances were responsible for the structural failure. However, based on our data, the number of observations is 26 and F (6, 19) is 1,06 For euro next and the probability value "Prob>F "0.4219 percent, the R-square of this pooled regression table is 0.25 percent, and the model assumes that the six companies have different intercepts. For Euronext, F (4.21), The prob>F, and R squared equal to zero.

Table 3. Summary Regression

Euronext	**OBS**	**MEAN**	**STD**	**MIN**	**MAX**
Returns	28	82541,11	46980,96	2	148129
Close	28	7316702	9049467	94	2,95
Volume	28	14,5	8,225975	1	28
Turnover	28	14,5	8,225975	1	28
Confirmed death	28	14,5	8,225975	1	28
Confirmed cases	28	14,5	8,225975	1	28
Returns	28	6,4642	3,6765	1	12
SSE Indexes	**OBS**	**Mean**	**STD**	**MIN**	**MAX**
Confirmed death	29	98474,45	888,6574	9692	223933
Confirmed cases	29	4377,586	38402,44	259	4636
Close	29	15	8,514693	1	29
Volume	29	15	8,514693	1	29
Turnover	29	15	8,514693	1	29
GDP	27	5	8,514693	1	29
Returns	29	15	3,78225	1	29

Data were collected during covid 19 and allow us to examine the relationship between the dependent and independent variables. This table contains 28 observations, and the three stock market indices are arranged in the same column. The Euronext ranks first with an average of 82541.11, while the SSE ranks second with an average of 98474. The SandP500 has an average 15 points lower than the other two. Euronext's standard deviation is 4,698, Shanghai's is 3,78, and the S&P 500's is 8,514. The minimum value for the entire stock market is close to 1, while the maximum number is 29.

Table 4. Summary Regression Pre-covid 19

Variable	OBS	Mean	Std dev	Min	Max
SandP500					
Close	92	46,5	26.7020	1	92bg
Returns	92	46,5	26.702	1	92
GDP	92	44,5108	25.21	1	86
Euronext	**OBS**	**Mean**	**Std dev**	**Min**	**Max**
Close	92	46.5	26.70	1	92
VOLUME	92	46.5	26.70	1	92
TURNOVER	92	46.5	26.70	1	92
RETURNS	92	13.68	7.9613	1	27

With 92 observations, this table shows us the daily stock prices for each of the three indices. We have also organized the three stock market indices in the same table to make it easier for us to observe the correlations between the dependent and independent variables. First, the Euronext and SSE both have averages of 46.5 and 46.5 respectively. Finally, the SandP500 has an average that is 15 points lower than the other two. The Sand P500 has a standard deviation of 8,514 and the Euronext has a standard deviation of 4.698. For the entire stock market, the least value is almost 1, and the largest is 29.

Table 5. Correlation Matrix

Panel 1 Euro Next	**Conf Death**	**Close**	Volume	Turnover	Return	GDP
Conf cases						
Conf death	1					
Close	-0,5740	1				
Volume	-0,4613	0,082	1			
Turnover	0,0453	-0,109	-0,0856	1		
Return	-0,0794	0,0457	-0,1548	-0,1466	1	
Gdp	0,9129	-0,4341	-0,3232	0,3098	-0,0792	1
Panel 2 SSE	**Confirmed death**	**Close**	**Volume**	**Turnover**	**Return**	
Conf cases						
Conf death	1					
Close	0.4540	1				
Volume	0.0860	0,5153	1			
Turnover	0.1287	-0,1082	-0,0495	1		
Return	0.3416	0,1681	0,1267	0,0926	1	
GDP	0.3646	-0,3648	-0,3758	0.1205	0.1504	1
Panel3 Sand P	**Close**	**Conf cases**	**Conf Death**	**Return**	**GDP**	
Close	1					
Conf death	0,0164	0.016	1			
Return	0,1343	0.134	0.1202	1		
Conf cases	0,3397	0.3067	0.3400	1		
GDP	0,9581	0.95	0.0787	0.0803	1	

Empiral Result

We next looked at the correlation matrix between the variables in order to address the issue of collinearity and multicollinearity in the estimate. Table 6 displays the correlation matrix's findings. The correlation between variables is typically negative, with the exception of the positive and statistically significant relationship between the Covid 19 Verified Death, GDP, Stock Price, Close, and the Stock Markets of Sand P and Shanghai. At the 5% level, each correlation is significant.

While a low correlation coefficient suggests a weak association between the variables, a negative correlation value denotes an inverse relationship between them. As can be seen in the table, the correlation values between the repressors are moderate, hence

multicollinearity is not a problem.

Panel Unit Root Test:

Examining the cluster regression model comes first. This kind of model has constant coefficients for both the ordinates and the slopes. We may pool all the data and create an ordinary least squares regression model for this model. With 89 observations total, the regression model is run without taking into account the cross-sectional and temporal character of the data. As seen in the table below, the pooled regression model is as follows**:**

Table 8. Panel 1-unit root test for SandP500

H0= Random walk without drift, d =0

Ha: Variable is stationary/ has no unit root.

Dickey-Fuller: Critical value

	1%	5%	10%	
Z(t)	-11.808	-3.503	-2.889	-2.579

Mackinnon approximate p-value for Z(t) = 0,0000

Return	Coefficient	Std .err	t	p<[T]	[95%conf.	Intervalle]
Return						
L1	-1.077	0.0912477	-11.81	0.000	-1.2581	-0.8967481
Cons	66.1956	6.381011	10.37	0.000	53.5595	78.83178

Panel 2. Unit root test for SSE

Return	Coefficient	std err	T	P >[t]	[95% conf	.intervalle]
Return						
L1	-1.195198	0.09000	-13.28	0.0000	-1.37344	-1.016954
Cons	13.57201	1.136347	11.94	0.000	11.321	15.822

Panel 3. Unit root test for Sand 500

Test Statistic

		1%	5%	10%
Z(t)	-6,08.046	-3.503	-2.889	-2.579

Mackinnon approximate p-value for Z(t) = 0,0000

Returns	Coefficient	Std.err	T	P>[T]	[95% conf.	Intervalle]
Return						
L1	-0.92199	0.91776	-10.05	0.000	-1.1037	-0.7402
Cons	2	1.46637	8.80	0.000	9.99	15.80454

Panel unit Root Result

It is required that variables be stationary as a preliminary check prior to doing a regression analysis. The tables below show the results for ADF test f Test statistic < Critical Value and p-value < 0.05 – Reject Null Hypothesis (HO) i.e., time series does not have a unit root, meaning it is stationary. It does not have a time-dependent structure. The ADF statistic can be rejected by comparing Test Statistic with the critical values i.e., as (-6,08), (-11,80), and (-13,279) < (-3,50, -3,73, -3,46) thus the null hypothesis of having unit root in stock returns is rejected. This could also be done by comparing the p-value i.e., 0.000 with the significance level considered for the study i.e., 0.01, 0.05, or 0.10. Therefore, it is observed that the null hypothesis is rejected for most of the variables in this study at all levels of significance.

Empirical Result

This paper uses the daily price and return of three stock indices SandP500, SSE, Euronext. First, we calculate the descriptive statistics of the price and return of these indexes.

COVID-19 is expected to have a detrimental impact on stock returns. The indices' standard deviation has increased during the study, indicating greater volatility. Table 1's mean return, a crucial profit indicator, is negative, indicating a stock loss; Table 2's negative afterward, indicates a detrimental effect.

Next minimum values are 1, maximum values are 2, 1, 1. Average daily mortality is 97, ranging from 0 to 3,876 deaths. The indexes have a standard deviation of 8,55 before covid 19 and 26,70 post-covid 20.Table 6: SandP500 After the covid 19

Result of the Garch test in this table, we present the Garch model for the three stock markets (SSE, Euronext, SandP500).

ARCH family regression

Sample: 1 to 29 Number of obs = 29

Wald chi2(1) = 0.14 Log likelihood = -92.79035 Prob > chi2 = 0.7051

CLOSE	Coefficient	Std. err.	Z	P>|z|	[95% conf. interval]
RETURNS	-.0260875	0689395	-0.38	0.705	-.1612064 .1090315
_cons	14.86718	1.016384	14.63	0.000	12.8751 16.85925
Arch	| 1.103281				
Arch L1	.6777944	1.266314	0.87	0.790	-1.378649
Cons		2.54808	0.27	0.384	-4.31635 5.671939

Table 7. SandP Before Covid 19

Close	Coeff	Std.err	Z	P(Z)	95%Conf.Intervalle
Return	0.009545	0.231505	0.41	0.680	-0.358282 0.549
-Cons	46.0074	1.4420	31.90	0.000	43.1810 48.83378
S	1.03005	0.91813	1.12	0.262	-76945 2.829552
	0.75358	2.8904	0.26	0.794	-4.9116 6.418854

ARCH Family Regression

Sample: 1 to 92 Number of obs =92

Wald chi2(1) = 0.17 Log-likelihood = -394.123 Prob > chi2 = 0.6801

In order to examine the impact of the COVID-19 pandemic on stock return and volatility in China, Europe, and the US, we use the Garch Test and separate into two groups: before COVID-19 and after COVID 19. The data consists of 130 observations. In This case, the coefficient of the return is negative with a value of – 0,02608 and the standard deviation is 068, the Z value is – 0,38. The SandP500 indexes of the US stock market are the dependent variable, and the P value is 1% significance. The constant represents the average stock return. The return is very significant at 0,009. This tells us that the past value of the stock is significantly predicted by the current value, so the past value has a very strong predictive power of the current stock.

At the 1% level, the coefficient of the constant variance term for the arch parameters is positive and statistically significant. But the panel 2 englobes 92 observations and indicates the volatility of the stock market before the COVID 19, and the coefficient of the return before COVID is positive and it's not statistically significant at 1 percent level. The standard error is at 0.23.

These findings clearly demonstrate the presence of the varying conditional volatilities of the return of the SandP stock. This also indicates the persistence of volatility shocks; it indicates that the effect of today's shocks will remain in the forecast in the future.

Table 8. Euro next Garch After Covid

ARCH family regression

Sample size: 1 to 29 Number of obs = 29 Wald chi2(1) = 0.00 Log-likelihood = -92.96409 Prob > chi2 = 0.9472

Close	Coef	Sdt err	Z	P (z)	95 % coef interval
Return	.0095459	.0231505	0.41	0.680	-.0358282 0.549199
-Cons	46.0074	1.442056	31.90	0.000	43.18102 48 .83378
Arch	1.03005	0.91813	1.12	0.262	-.7694518 2.829552
-cons	.7535895	2.890494	0.26	0.794	-4.911675 6.418854

Table 9 : Next Euro before

ARCH Family Regression

Sample: 1 to 92 Number of obs = 92

Wald chi2(1) = 0.7 Log-likelihood = -393.7234 Prob > chi2 = 0.3998

Close	Coef	Std.err	Z	P(z)	(95%Conf Interval
Return	-.0813967	.0966827	-0.84	0.400	-.2708913 .1080979
-Cons	47.1399	.9406516	50.11	0.000	45.29626 48.98354
Arch L1	1.04077	8514753	1.22	0.222	.6280913
Cons	.6523282	2.394919	0.27	0.785	2.709631

For the purpose of examining the impact of the COVID-19 pandemic on stock return and volatility in Asia, Europe, and the US, we use the Garch Test and divide into two groups: before COVID-19 and after COVID 19. The data contains 130 observations. The standard deviation in this case is 068, the return coefficient has a negative value of -0,02608 and the Z value is -0,38.The SandP500 indexes of the US stock market serve as the dependent variable, and the P value is statistically significant at the 1% level. The constant stands for the typical stock return. The return is very impressive at 0,009. This demonstrates that the stock's present value largely forecasts its previous value, therefore the current in the historical A stock's value has a high degree of predictive potential.The coefficient for the arch parameters in the constant variance term is positive and statistically significant at the 1% level. The stock market's volatility previous to COVID 19 is shown in panel 2, which contains 92 data. Despite the fact that the coefficient of return prior to COVID is positive, it is not statistically significant at the 1% level. The standard deviation is 0.23. These findings clearly demonstrate the existence of various conditional volatilities in the SandP stock return. It also demonstrates the persistence of volatility shocks and the predictability of their impact in the future.

Table 10 : Before Shanghai Stock Market

ARCH family regressio

Sample : 1 to 29 Number of obs = 29

Wald chi2(1) = 0.58 Log-likelihood = -92.62802 Prob > chi2 = 0.4482

Close	**Coef**	**Std.err**	**Z**	**P(z)**	**(95%conf. Interval)**
Return	-.1009152	.1330621	-0.76	0.488	-.3617122 .1598819
-Cons	15.95633	.8083807	19 .74	0.000	14.37193 17.54072
ARCH L1	1.146708	1.050094	1.09	0.275	-.9114379 3.204854
-Cons	.561008	1.032994	0.54	0.587	-1.463624 2.58564

Table 11. After Shanghai Stock Market

ARCH Family Regression

Sample: 1 to 29 Number of obs = 29

Wald chi2(1) = 0.58 Log-likelihood = -92.62802 Prob > chi2 = 0.4482

Close	Coef	Std.err	Z	P(Z)	(95%Conf.Intervall)
Return	0.5911	0.1457	0.41	0.684	-0 .2254881.0.3437
-Cons	46 .17465	2.2452	20.57	0.000	41.774.50.57526
Arch L1	1.029	0.8424	1.22	0.22	-0 .6214 2.680983
-Cons	0.9619	2.4829	0.39	0.698	-3.9045 5.828419

For the purpose of examining the impact of the COVID-19 pandemic on stock return and volatility in Asia, Europe, and the US, we use the Garch Test and divide into two groups: before COVID-19 and after COVID 19. The data contains 130 observations. The standard deviation in this case is 068, the return coefficient has a negative value of -0,02608 and the Z value is -0,38.The SandP500 indexes of the US stock market serve as the dependent variable, and the P value is statistically significant at the 1% level. The constant stands for the typical stock return. The return is very impressive at 0,009. This demonstrates that the stock's present value largely forecasts its previous value, therefore the current in the historical A stock's value has a high degree of predictive potential.The coefficient for the arch parameters in the constant variance term is positive and statistically significant at the 1% level. The stock market's volatility previous to COVID 19 is shown in panel 2, which contains 92 data. Despite the fact that the coefficient of return prior to COVID is positive, it is not statistically significant at the 1% level. The standard deviation is 0.23.These findings clearly demonstrate the existence of various conditional volatilities in the SandP stock return. It also demonstrates the persistence of volatility shocks and the predictability of their impact in the future.

CONCLUSION

This study examines the impact of COVID-19 on the stock market return in China, Europe, and the US from March 31, 2019, to March 31, 2022. From the body of literature already in existence discussing the effects of the Importantly, the research will help investors and decision-makers in the governments of China, Europe, and the United States. It will also be very helpful for the stock market's applied economics major study. Additionally, we looked into how deaths connected to COVID19 affected these indices. Naturally, our data shows that COVID-19 has had a detrimental impact on important stock indices, leading to an unheard-of rise in conditional volatility. The research discovered a strong and significant link between all 19 confirmed COVID cases and stock indexes from May 31, 2012, to May 31, 2022 (Shanghai Stock Exchange, Standard & Poors, and Euronext). This suggests that the COVID-19 significantly impacted the financial markets. There is a negative correlation between the variables, with the exception of the positive and statistically significant relationship between the covid 19 confirmed death, GDP, stock price, close, and Sand P and the Shanghai stock market. While the negative correlation value shows an inverse association, the low correlation suggested a weak relationship between the variables.

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