


## Analysis of the relationship between COVID-19 and the stock market performance in South Africa

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### ABSTRACT

*The paper's objective was to investigate the relationship between COVID-19 and South Africa financial stock markets. The pandemic worsened South Africa's unstable financial condition and societal problems: business was severely disrupted, as were the travel industry, hospitality, food security, small businesses, and many other sectors. The results show that the COVID-19 pandemic triggered high and longer-lasting financial volatility in the markets. The higher level of volatility persistence suggests a prolonged period of increased uncertainty. Overall, the uncertainty about the vaccine's effectiveness towards the pandemic provides low expectations about the future of the stock market, since there are variants that are still being discovered.*

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## Introduction

The coronavirus, also known as COVID-19, was originally discovered in Wuhan City, China, in December 2019 and was officially confirmed as an outbreak by the World Health Organization (WHO) on March 12, 2020 (Guan, Ni et al. 2020). Even though the pandemic arrived in South Africa at a late stage compared to the rest of the world, it had a widespread effect on all South Africans. On March 23, 2020, the president announced a state of national catastrophe. Such effects and development limit the social and economic activities around the world. The flight and border crossings between the various countries which are deemed risk are cancelled and closed, and the global trade, tourism, production and transportation are most negatively impacted. Several countries that import Chinese products or have their goods produced in China have agreed to cease doing so. Considering all these negative consequences, it seems that financial markets, economic growth, and exchange rates will all be massive impacted (Guan, Ni et al. 2020).

Therefore, investigating the catastrophic caused by a pandemic is imperative for policymakers such as the government, but complicated because the impact has unfolded with extreme speed. Almost every element of medical care systems' ability to meet an unprecedented challenge is unclear, including how long it will take to create and implement safe, effective vaccines, the final size of the mortality shock, and the length of time and role of social distancing, business lockdowns, as well as other remediation and control strategies, the effect on a business ability to survive, business development formation, R&D, investment, and other forces that determine economic output over the longer term; and the magnitude to which contagion changes the consumer buying habits will continue to exist; and the effect on economic survival (Baker, Bloom et al. 2020).

This paper aimed to investigate the relationship between COVID-19 and South Africa financial stock markets. How did the South African financial markets react to the pandemic? How responsive were different markets indices after the outbreak? These are the questions the paper will try to answer as the pandemic outbreak had a significant impact on the capital market due to factors such as less labour productivity and economic activity as the pandemic forces government to impose the lockdown. Comprehending the relationship between the variability of stock prices and investors decisions on the markets is significant to execute sound measures required in the markets. The hypothesis of the paper is based on the fact that Covid-19 had a significant impact on the stock market

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on the equity stock market. To save lives, corporate organizations have decided to suspend their activities partially or completely, resulting in severe productivity losses and increased layoffs. The results of our research will be of great help to the competent authorities in developing appropriate strategies for dealing with the crisis. The paper set to identify the impact the outbreak had on the South African stock market economy. The paper research is set as follows: The first part of the paper will provide the literature review, whereas the second part of the paper will give the methodology of the paper and lastly, the last part will discuss the results and provide a conclusion of the paper.

## **Literature Review**

South Africa's lockdown rules to manage the virus had a notable economic ramification, affecting the rest of the nation demand and supply for South African exports/imports. The COVID-19 uncertainty is a factor driving local returns, though its significance has begun to wane as a result of the compelled sharp fall caused by a national shutdown and other constraints on non-essential business functions, including the impact of the lockdown on household demand (Arndt, Davies et al. 2020). China was considered as an emerging market 17 years ago, but it is now known as a global manufacturing hub, producing high-demand electronics such as the iPhone and serving as a major user of copper and oil around the world (Alameer, Abd Elaziz et al. 2019). China, which played a role only 4% of global GDP in 2003, has now grown to become an industrial superpower, accounting for 16% of global GDP. (Horowitz, 2020).

The global financial markets have reacted to the pandemic in an unprecedented, but uneven, manner. To re-establish trust in the financial markets, governments and reserve banks have quickly implemented stimulus packages and related policies to combat the adversaries. Although stock markets have generally reacted negatively to the COVID-19 outbreak and recovered somewhat following the announcement of rescue package programs, the precise direction and magnitude of stock market reactions to these events (announcements of COVID-19 outbreak and stimulus packages) remain unknown (Rahman, Amin et al. 2021). The rapid contagious spread imposed significant risks to stock market investors, increasing stock market volatility in the Johannesburg Stock exchange (JSE) and worldwide. Hence, the only solution to stop the increased number of the virus was to mitigate the gatherings of people around the country through what is called the lockdown to reduce the contamination breaking the economy of contact, only a few essential activities were permitted on strict regulation. Such policies had a significant negative impact on the economy, resulting in an immediate loss of economic activity, as well as short and long-term financial implications (Shaikh 2020).

Furthermore, the increase in COVID-19 cases has a significant impact on the stock market. Moreover, the uncertainty surrounding the COVID-19 cases affects stock markets and the people who work in them (Xu 2021). The pandemic worsened South Africa's unstable financial condition and societal problems: business was severely disrupted, as were the travel industry, hospitality, food security, small businesses, and many other sectors. The nation has the most cases reported in Africa, with 1,69 million cases by 11 May 2021, and once had the fifth-highest total infection rate in the world (Hossain 2021). Moreover, (Kusumahadi and Permana, 2021) investigated the effect of COVID-19 volatility on the stock market in 15 different countries around the world employing the data from Jan 2019 to Jun 2020 and discovered that currency fluctuations had a negative impact on stock earnings in most countries. As a result, stock returns are typically highly volatile, implying that their values fluctuate rapidly and are unpredictable over time. Market returns variance varies over time, therefore big changes can be accompanied by the same changes in the next period, or small changes by smaller changes in the next period (Hill et al., 2018).

To ease the burden from the health system, a five-stage lockdown was implemented. The lockdown was tight, with only critical services being allowed to travel. The leisure and tourism industries suffered a noticeable effect as a result of the drastic lockdown measures. Small companies have been destroyed by the economic downturn, and the losses of jobs have exacerbated to already high rate of unemployment rate and socioeconomic disparities among residents in south Africa (Young 2020). Africa has experienced a lot of diseases over the past decades, such as HIV/AIDS, Ebola, and Cholera but there has never been something like coronavirus. No one predicted this to happen, let alone the impact it has caused on the financial market. The pandemic has affected all the sectors worldwide from health to economic and no other disease outbreak, including the Spanish Flu, had a greater impact on the stock market more than the COVID-19 (Young 2020). It was the most jump in a single trading day in the history of the United States. The global epidemic was faulted for 15 to 16 of these increases, according to daily paper projections. This rate of jumps was 23 times greater than the long-term average since 1900. According to the research, the modified movement was driven by economic policies in reaction to the coronavirus pandemic. because of the confusion caused by the pandemic crisis and the threat of losing income in the industry, trillions of dollars in funds were flushed out of global capital markets in the week of February 24th (Baker et al., 2020).

## **Methodology**

The information was derived from the secondary data obtained from IRESS database covering a period of 1-years from 06 December 2019 where the pandemic was first announced to 06 January 2021. For the data and research analysis, the Microsoft Excel application was used for description analysis. The compounded weekly and, 13 equity indices that operate in the Johannesburg Stock Exchange (JSE) are used to examine the performance of the financial stock market as each index consist of the average returns for that industry. All the data analysis will be performed in Microsoft office excel, the ratios, regression statistical analysis. The South African FTSE/JSE Resource Index 10 represent the country's top 10 largest resource firms by market capitilization, such as Anglo American, Sasol, Mondi etc. Whereas the South African Financial Index is made up of the 15 largest financial firms listed on the JSE by market

cap, from the top four banks to investment companies such as Discovery, Capitec, PSG Group etc. Furthermore, the top 40 index consists of the 40 largest companies on JSE. All Share index is made up of all listed companies on JSE. The Small-cap index is made up of companies that have a market capitalization below 1 billion Rands, Medium-cap is made up of firms with a market cap between 1 billion to 10 billion Rands and Large-cap companies are made up of companies with a market cap above 10 billion. (Johannesburg Stock Exchange, 2021). In addition, another index of the category of sectors that were mostly affected by COVID-19 includes the health care index; Oil, Gas & Coal; Personal care, Drug, Grocery store; Technology; Travel and Leisure.

Returns were computed using the following equation:

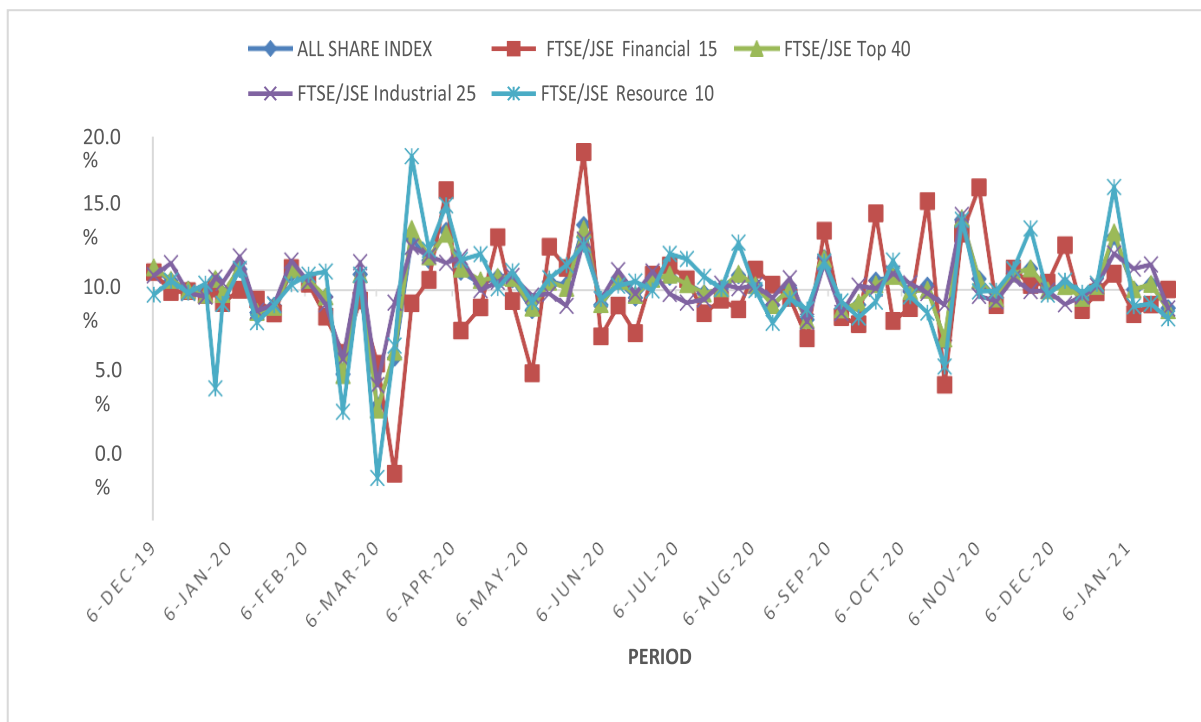
$$R_{pt} = ((P_{1t} - P_{0t}) / P_{0t}) \times 100 \quad (1)$$

R<sub>pt</sub> = Monthly return of the fund

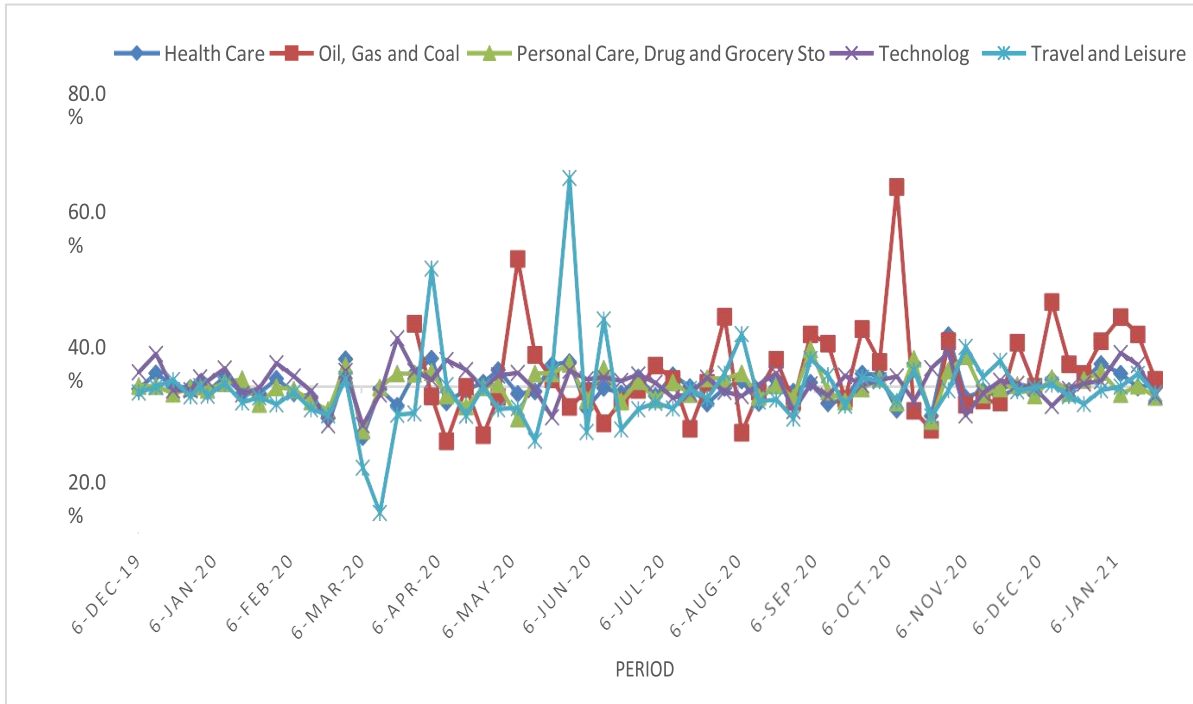
P<sub>1t</sub> = Price at the end of the month

P<sub>0t</sub> = Price at the end of the previous month

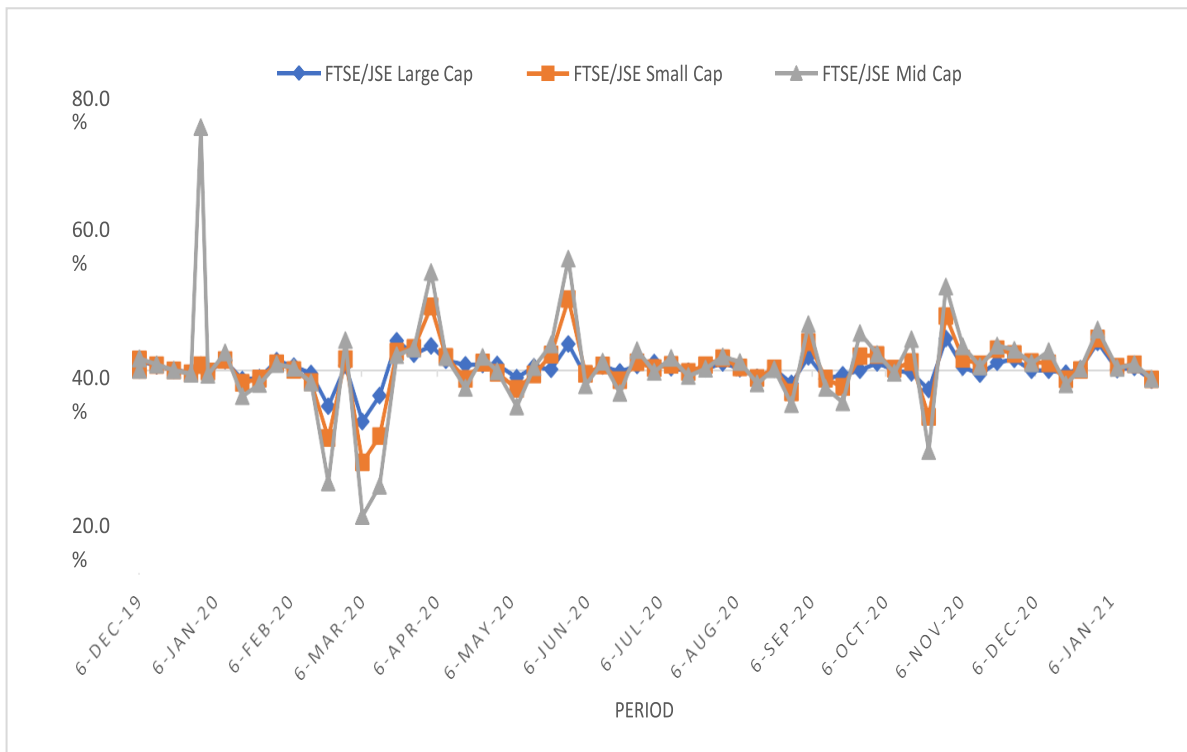
## Results



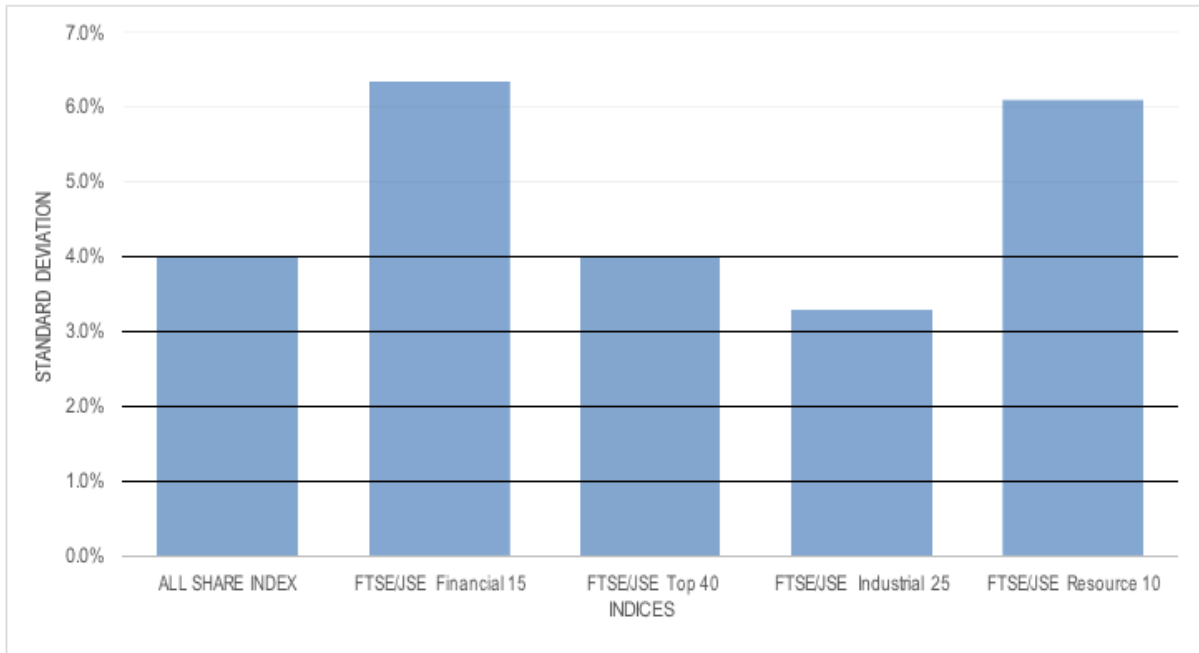
**Figure 1:** Average returns for All share Index, Financial 15, FTSE/JSE Top 40, Industrial 25 and Industrial 10 over the period of 1 year



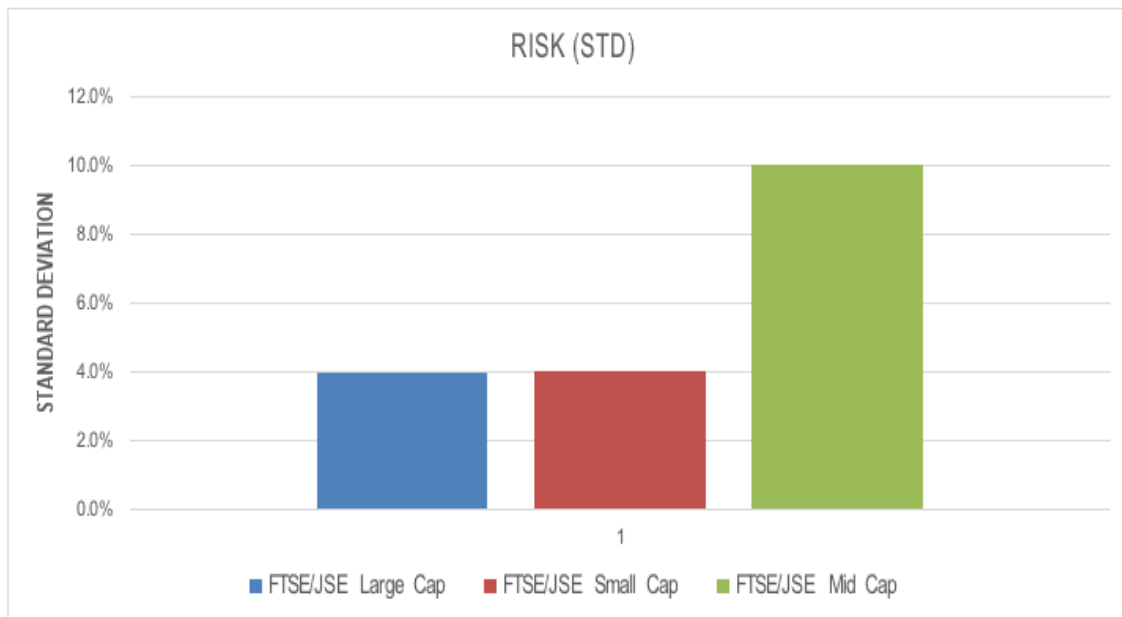
**Figure 2:** Average returns for Health care, Oil, Gas & Coal, Technology, and Travel & Leisure sectors



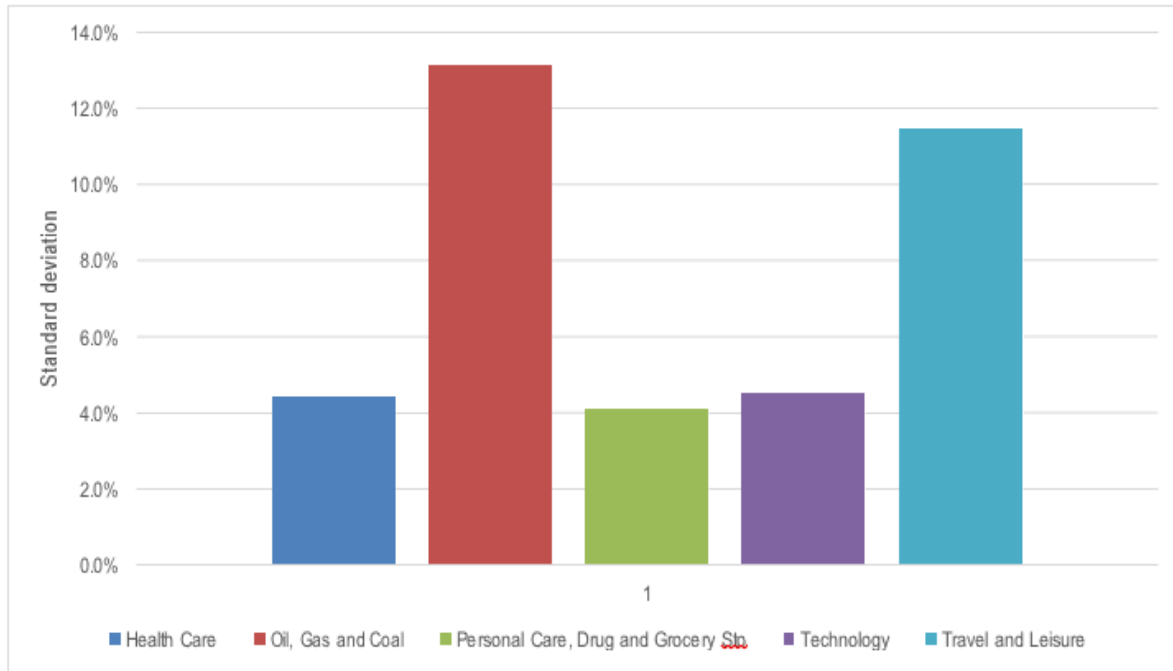
**Figure 3:** Average returns of Large, Mid, and Small Capitalization



**Figure 4:** The measure of standard deviation in JSE Indices



**Figure 5:** The measure of standard deviation in Large, Mid and Small Capitalization



**Figure 6:** The most impacted market sector indices volatility

**Table 1:** Descriptive Analysis for top indices

	ALL SHARE INDEX	FTSE/JSE Financial 15	FTSE/JSE Top 40	FTSE/JSE Industrial 25	FTSE/JSE Resource 10
Mean	0,0028	-0,0026	0,0034	0,0044	0,0029
Standard Error	0,0051	0,0082	0,0051	0,0042	0,0079
Median	0,0067	-0,0068	0,0058	0,0022	0,0020
Standard Deviation	0,0395	0,0639	0,0400	0,0332	0,0614
Sample Variance	0,0016	0,0041	0,0016	0,0011	0,0038
Kurtosis	4,4167	3,2268	4,5739	4,0200	4,9607
Skewness	-1,1330	-0,2133	-1,1244	-0,7793	-0,9739
Range	0,2425	0,4178	0,2485	0,2208	0,4179
Minimum	-0,1515	-0,2391	-0,1558	-0,1237	-0,2445
Maximum	0,0910	0,1787	0,0928	0,0971	0,1735
Sum	0,1702	-0,1568	0,2050	0,2712	0,1762

**Table 2:** The descriptive analysis of market cap indices

	FTSE/JSE Large Cap	FTSE/JSE Small Cap	FTSE/JSE Mid Cap
Mean	0,0036	0,0008	0,0099
Standard Error	0,0051	0,0052	0,0131
Median	0,0040	0,0023	-0,0003
Standard Deviation	0,0396	0,0410	0,1021
Sample Variance	0,0016	0,0017	0,0104
Skewness	-0,9351	-0,1743	5,1420
Range	0,2442	0,2522	0,8574
Minimum	-0,1513	-0,1202	-0,1578
Maximum	0,0929	0,1320	0,6996
Sum	0,2224	0,0517	0,6041

**Table 3:** Top different sectors indices stock returns

	Health Care	Oil, Gas and Coal	Personal Care, Drug and Grocery Sto	Technology	Travel and Leisure
Mean	-0,0004	0,0424	-0,0010	0,0098	-0,0084
Standard Error	0,0057	0,0200	0,0053	0,0058	0,0148
Median	-0,0037	0,0149	-0,0013	0,0153	-0,0157
Standard Deviation	0,0444	0,1326	0,0412	0,0454	0,1155
Sample Variance	0,0020	0,0176	0,0017	0,0021	0,0134
Kurtosis	1,7841	3,7368	0,7320	0,9094	11,3230
Skewness	0,0851	1,4740	-0,1828	-0,2318	2,0752
Range	0,2776	0,6927	0,2201	0,2361	0,9118
Minimum	-0,1368	-0,1487	-0,1187	-0,1045	-0,3435
Maximum	0,1408	0,5440	0,1014	0,1316	0,5683
Sum	-0,0236	1,8650	-0,0593	0,5981	-0,5094

The purpose of this study was to investigate the dynamic response of stock returns to unexpected changes and the uncertainties associated with the pandemic outbreak. Using weekly data from the South African indices, the results indicate that the increased lockdown period generally has a negative impact on the stock market. In addition, the reaction to stock returns is asymmetrical. Asymmetry is caused by the negative effects of pandemic uncertainty. Based on panel data, we found that the stock market responded negatively to the longer period of lockdown which was imposed to mitigate the spread of the virus. On the other hand, the outbreak also brings a lot of uncertainty to the economy. In the financial sector, one of the direct consequences of a pandemic is a significant increase in volatility. We have identified the current pandemic as having the greatest impact on stock market volatility in the history of the pandemic. Evidence shows that the volatility index has a long memory. This is a statistical characteristic that portrays the major impact the pandemic had on the outbreak.

The graphs show the results of the financial market reaction to the restriction of the pandemic. Figure 1 shows that the mining industry experienced the largest volatility between March 6th and April 6th, with the stock index falling with a negative return of 25%. It was at its lowest level, but rose again two days later, recording a 15% return. Sasol was greatly influenced by the raw material company. In addition, figure 2 also shows indicators for various sectors heavily affected by the coronavirus. South Africa recorded the first case on March 5, 2020. Extreme blockades have a visible impact on South Africa's leisure and tourism industry. Many restaurants, hotels, guest houses, wineries and fitness centres had to be closed, and many people working in the fitness and food industry (including agriculture) lost their jobs. The returns at the Travel and Leisure enterprise attain their lowest terrible returns of 35% in March after the statement of the lockdown, while the Oil, Gas & Coal region recorded a 15% loss for March.

The standard deviation of each sector affected by COVID-19 reached its highest and lowest levels in March/April 2020. In addition, this high volatility is present in a wide range of returns in a short period. For example, Figure 4 shows that the standard deviations of the financial sector and the natural resources sector were the highest at 6.3% and 6.1%, respectively. Industrial reported a minimum standard deviation of 3.3%. In addition, the graph in Figure 5 shows that Midcap reached the highest standard deviation of 10.3% during the pandemic crisis compared to other counterparts such as small-cap and large-cap. As expected, Figure 6 shows that oil, gas and coal have a high volatility risk of 13.1% due to the low demand for these minerals in the market. Travel and leisure recorded one of the highest volatilities at 11.1%. The closure of restaurants, hotels, and tourism has had a significant impact on the average risk rate of return for the travel industry.

## Discussions and Conclusion

In conclusion, the results do show that the pandemic outbreak did have a significant impact on the stock market as indicated by (Kusumahadi and Permana, 2021) in their paper. The prolonged lockdown provides more uncertainty to investors. The total number of lockdown periods and the number of those who are being affected patients have a significant impact on stock prices, but all variables have a significant impact on economic activity. Legislators, government agencies, businesses, scientists, researchers, and people of all levels are interested in both health and finance, affecting the financial base and sacrificing valuable lives across the country. The study adds to a body of knowledge by investigating the impact of outbreaks in south African financial markets. Subsamples before and after the pandemic estimated the recall of dozens of volatility indicators. Our results show that volatility measurements not only peaked during the pandemic but became much more persistent. The COVID-19 pandemic has caused periods of high and long-term financial volatility in several different markets. Our findings are of interest to investors and asset managers because the higher level of volatility persistence suggests a prolonged period of increased uncertainty, which should be factored into trading strategies. Overall, the uncertainty about the vaccine's effectiveness towards the pandemic provides low expectations about the future of the stock market, since there are variants that are still being discovered. The market will take months or even years to recover from the damage of the pandemic, but there is hope.

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