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The Effects of COVID-19 on Stock Market Performance: Evidence from Dar Es Salaam Stock Exchange

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The effects of COVID-19 go beyond July 2020. However, this study ends July 2020. The future similar studies can extend to the other periods

Abstract: ***This article examines the Impact of COVID-19 on Stock Market Performance: Evidence from Dar Es Salaam Stock Exchange. Using conventional t-tests and nonparametric Mann–Whitney tests, we empirically analyze daily return data from Dar Es Salaam Stock Exchange (DSE). The study uses an event study methodology that employs sales turnover measures of operating performance where an analysis of the companies that listed in DSE for the period from March – July 2020 is used. The consequences of infectious disease are considerable and have been directly affecting stock market in Tanzania. Our results indicate that the stock market in Tanzania fell quickly after the virus outbreak. There is a significant decline in daily return in the four months following the announcement of the Outbreak of COVID-19 in Tanzania, that is, March - July 2020. The study contributes to the literature in at least two important ways: First, we contribute to the studies which have examined the stock market response to different disasters and crises. Second, we contribute to the recently emerging literature which examines the impact of COVID-19 on financial markets.***

Keywords: COVID-19; coronavirus disease; stock market performance

1. Introduction

The first case of COVID-19 was identified by the World Health Organization (WHO) in Wuhan China on 31st December 2019 (https://www.who.int/emergencies/diseases/novel-coronavirus-2019). WHO declared a global emergency due to the rapidly spreading of COVID-19 on January 30, 2020. WHO had announced such type of global emergency has been announced in the past such as Ebola outbreak and the Zika virus. According to the Centre of Disease Control and Prevention (CDC), the COVID-19 symptoms may occur within as few as 2 days or as long as 14 days after exposure or contact with an already affected person, which makes it even harder to confirm and control during early stages. By assessing the risk of spread and severity of COVID-19 outside China, WHO declared this virus as a pandemic on March 11, 2020. The fatality rate of COVID-19 as compare to other known viruses is quite low, but its infection rate is relatively high (Table 1). As of August 12, 2020, the total cases worldwide is 20,541,951 (death 746,326 and recoveries 13,460,634). United States, Brazil, and India have most of the number of confirmed cases of COVID-195,305,957; 3,112,393; and 2,332,908 respectively (www.worldmeters.info/coronavirus). According to CDC and many other researchers at the moment, the source of COVID-19 is unknown and there is no specific vaccine and treatment.

Table 1: Fatality Rates and Infection Rates of COVID-19 and Other Epidemics.

Epidemics	Fatality Rate (Deaths / Cases)	Infection Rate (Per Infected Person)
Ebola	50%	1.5 – 2.5
MERS	34.30%	0.42 – 0.92
COVID-19	1% - 4.5%	1.5 – 3.5
SARS	10%	3
Seasonal Flu	1% - 3.4%	1.3

Source: https://www.adb.org/publications/economic-impact-covid19-developing-asia

All sectors of the economy were affected worldwide. The risk of an outbreak to the investors were not known towards the disease. For example, in the stock market, investor's sentiments influence the stock markets significantly. When the market is trending upwards and there is less perceived risk then investor behaves more optimistically. When the market is trending downwards then investors' sentiments become relatively pessimistic and investors will tend to wait to enter the market until a revival begins. Such situations lead to short term investor overreaction. Researchers suggest that media coverage also affects the actions of investors, the higher the number of articles relating to unexpected events, the greater the number of withdrawals (Engelberg, 2011). Globalization has linked economies worldwide and increased the interdependence of global financial markets in recent years. This increased interdependence among the global stock markets may have an impact on global investors' decisions on asset allocation and on economies as well as economic policies to ensure economic stability (Siddiqui, 2009). Although globalization brings many significant economic advantages, it also plays an important role during infectious global crises. The world has recently been hit by increasing numbers of infectious diseases such as Crimean Congo hemorrhagic fever, Ebola virus, MERS

CoV, SARS, Lassa fever, Nipah Virus, avian flu, Rift Valley fever, Zika virus. The spread of contagious disease not only affects people's health and lives but also induces a decline in economic growth.

There are major challenges of COVID-19 to personal lives, including lockdowns (or lockdown-like situations) for a large number of people. Besides the extreme occurrences of death and disease, many people across the globe are panicking because of this fast-spreading infectious disease. Such external and unexpected shocks can bring down economic trends and suddenly change investor's sentiments. Investmentdecisionscanbeaffectedbybadmoodandanxietyand thatanxiousindividuals may be more pessimistic about future returns and therefore tend to take fewer risks. Anxiety creates a negative feeling which can impact investment decisions and the subsequent returns on assets. The unusual situation developed by COVID-19 offers us an opportunity to assess the pandemic's impact on the stock market in Tanzania due to an unforeseen and feared disease. In this article, we discuss the effect of COVID-19 on Dar Es Salaam Stock Exchange Market. Due to the short time of the virus outbreak, an event study is conducted to examine the impact of the unexpected outbreak of COVID-19 on stock market sales turnover.

The article contributes to the literature in at least two important ways: First, we contribute to the studies which have examined the stock market response to different disasters and crises. We complement these studies by examining the stock market reaction to COVID-19 pandemic. Second, we contribute to the recently emerging literature which examines the impact of COVID-19 on financial markets. Extending this debate, we examine how stock market returns have responded toCOVID-19 using data of DSE for a period from March to July 2020.

The remainder of the article is organized in the following sections: Section 2 includes the related theoretical and empirical literature, the data and methodology are discussed in Section 3, followed by the empirical evidence in Section 4, and Section 5 includes a conclusion.

2. Literature Review

The impact of the COVID-19 is of crucial importance, especially since its first outbreak happened in China, which is the main hub of foreign investment in Asia. Researchers believe that COVID-19 and SARS belong to the same family, but these two epidemics differ significantly. Many previous studies related to the economic effects of the infectious virus epidemic could be referred to as we discuss the impact of COVID-19.

2.1 Economic Impact of Virus Outbreak

Existing literature concentrates on illness-associated costs of medical or economic effects arising from morbidity as well as mortality due to disease. Siu (2004) studied the spread of Hong Kong's SARS epidemic, and addressed its economic impact and suggested that the most serious negative impacts were seen on the consumer side, with the short term severely affected by local consumption and the export of tourism and air travel-related services. The economy did not face any supply shock, as the manufacturing base present in the Delta of the Pearl River was unaffected and products were usually exported to Hong Kong. Lee (2004) evaluated the global economic impacts of the severe acute respiratory syndrome (SARS) and found that the effect of the SARS epidemic on human society all over the world is severe, not only because the disease spreads rapidly through countries by global travel, but also because of financial integration and globalization, any economic shock to one country spreads rapidly to others. Marinc˘ (2004) investigated whether the geographical proximity of information disseminated by the 2014 Ebola outbreak, coupled with widespread media coverage, has affected US asset prices. The results show that the effect on stock prices is generally negative, while local media reporting also has a significant impact on local trading, and the effect is more pronounced in smaller and more volatile stocks and less stable industries.

2.2 Impacts on Stock Market Performance

Looking at the effect on stock markets, DeLisle (2003) proposed that the cost of the 2003 SARS outbreak resulted in losses as high as in the financial crisis of Asia, estimated at $3 trillion value in GDP and $2 trillion value in financial markets equity. Nippani (2004) examined the effect of SARS on Canada, China, the particular administrative region of Hong Kong, Indonesia, China, Singapore, the Philippines, Vietnam and Thailand and concluded that SARS only affected the stock markets of China and Vietnam. Del (2017) evaluated the 78 mutual equity funds geographically based in African countries with observed monthly flows and results for the 2006–2015 period and suggested that Ebola and the Arab Spring seriously affect the funds flows, controlling the performance of the funds, spending, and returns of the market.

Macciocchi (2016) studied the short-term economic impact of the Zika virus outbreak on Brazil, Argentina and Mexico, and their results showed that, with the exception of Brazil, the market indices of these three Latin American and Caribbean Countries (LCR) did not show large negative returns the day after each shock. The average return was−0.90 percent but on different occasions and countries it ranged from 0.90 percent to−4.87 percent.

2.3 Linkages between Stock Markets during Crisis

On the linkages between Stock Markets during Crisis Stocks markets are interlinked and interdependent. Researchers have discovered the close cross-market correlations during the crisis. Chiang (2007) examined the daily stock return for nine Asian markets for the period of 1996 to 2003 and found that there was a high correlation among sample Asian countries during the period of crises. Sun*el al* (2018) found that in Southeast Asia, Malaysia, Vietnam, and Thailand were most financially integrated with China. According to Moralesa (2012) the global stock markets were becoming more interdependent and crisis in one country would soon spread to another. Stock market movements become increasingly correlated. Events like infectious disease outbreaks can induce negative changes in investors' sentiment that strongly affects their investment decisions

and, consequently, stock market prices. In countries that are culturally more susceptible to herd-like actions and overreaction or countries with low institutional participation, the effect of investor sentiment on stock markets is more pronounced.

Outbreak diseases, crises including terrorist attacks and epidemics, will cause shock, fear and panic among investors and result in a sharp panic-selling response. An expanding body of literature has addressed the impact of terrorists on the international stock markets. As Chen and Siems (2004) point out, terrorist attacks are unexpected events which seriously affect normal life and result in panic-selling ensues. Epidemics will inevitably have the same effect. Nippani and Washer (2004) focus on stock indices of eight seriously affected countries during the SARS period and find that SARS had no negative impact on the affected countries' stock markets with the exception of those based in China and Vietnam. Chen, Jang, and Kim (2007) study the impact of the SARS outbreak on the performance of hotel stocks in exchanges of the Chinese mainland and Taiwan and find a significant negative impact.

2.4 Impact of COVID-19 on Stock Performance

Qing *et al* (2020) examine the impact of COVID-19 on stock markets in the People's Republic of China, Italy, South Korea, France, Spain, Germany, Japan and the United States of America and report that (i) COVID-19 has a negative but short-term impact on stock markets of affected countries and that (ii) the impact of COVID-19 on stock markets has bidirectional spill-over effects between Asian countries and European and American countries. Similar results have been reported by HaiYue Liu *et al* (2020), Badar (2020), Heyden & Heyden (2020).

However, all of the above studies analyze the impact of COVID-19 on Asia, America and Europe stock markets. None of the studies have analyzed the impact of COVID-19 on emerging markets. Thus, this study extends the analysis of the impact of COVID-19 on stock performance by examining the impact of COVID-19 on emerging markets, specifically, the Tanzanian Stock Market. Our main hypothesis is that there is no impact of COVID-19 on the performance of Tanzanian Stock Market.

From the existing literature this study will generate new knowledge regarding the impact of COVID-19 on the financial market in Tanzania. Most importantly, the study will be very useful to the financial applied economics major study and support investors and decision makers in the government of Tanzania.

3. Data and Methodology

3.1 Sample Characteristics

The data used in this article tracks daily trading of all DSE companies for the period from January 2016 to July 2020. The focus of the study is the period from the announcement of the outbreak of COVID-19 by WHO in March 2020. We also analyze data as far as from October 2019 in order to assess the performance of the market in the period without corona virus (pre-COVID-19 period). We have two periods, pre-COVID-19 period (October 2019 – February 2020) and post-COVID-19 period (March – July 2020). [The effects of COVID-19 go beyond July 2020. However, this study ends July 2020. The future similar studies can extend to the other periods]. The outbreak of the virus in China was in December 2019 but the effects of the disease could have been felt by the other countries from that time. Table 2 reports descriptive statistics for DSE listed companies as at August 12, 2020.

The results in Table 2 shows that the total turnover was significantly affected in the months following the announcement of the outbreak of the COVID-19.

Table 2: Descriptive Statistics for DSE listed Companies as at July 3, 2020

Year	Month	Total Turnover (TZS Million)	Total Market Capitalization (TZS Billion)	Industrial & Allied (IA)	Banks, Finance & Investment (BI)	Commercial Services (CS)	All Share Index (DSEI)	Tanzania Share Index (TSI)
2019	October	43.61	18,986.01	4,749.95	2,027.71	2,369.12	1,969.74	3,437.49
	November	95.84	19,640.85	4,749.95	2,007.55	2,369.12	2,048.85	3,431.28
	December	380.11	16,924.72	4,749.95	2,006.94	2,369.12	2,038.52	3,431.10
2020	Jan	467.14	17,337.74	4,748.45	2,023.34	2,369.12	2,088.28	3,435.94
	Feb	139.26	17,545.43	4,746.80	2,274.97	2,369.12	2,113.29	3,512.27
	Mar	15.07	16,142.03	4,778.72	2,200.20	2,362.38	1,944.28	3,499.12
	Apr	26.56	14,667.99	4,775.53	2,150.05	2,362.38	1,766.73	3,484.11
	May	3.66	15,101.83	4,778.72	2,183.14	2,356.49	1,819.00	3,492.10
	Jun	35.38	15,066.20	4,778.72	2,166.06	2,356.49	1,814.72	3,486.95
	JULY	21.77	14,945.35	4,743.61	2,149.01	2,356.49	1,797.59	3,466.81

Source: https://dse.co.tz

The table presents the median daily data collected from the Dar Es Salaam Stock Exchange (DSE) for the period from October 2019 – July 2020. Industrial & Allied; Banks, Finance & Investment; and Commercial Services are the difference sectors which the DSE Companies belong. All Share Index (DSEI) is the index for all DSE Companies, while Tanzania Share Index (TSI) is an index for the only Tanzanian Companies listed in DSE.

3.2 Methodology

The main methodological approach of this article is an event study that employs turnover measures of operating

performance. Operating performance is used, as opposed to stocks returns, as performance metric, because share prices incorporate markets expectations of the value of the firm following COVID-19. DSE reports daily data on turnover in Tanzania shillings.

Performance is measured over the two periods, pre- and post- COVID-19 period. The pre-period is from October 2019 – February 2020, and the post-period is from March 2020 – July 2020 as shown in the Figure 1.

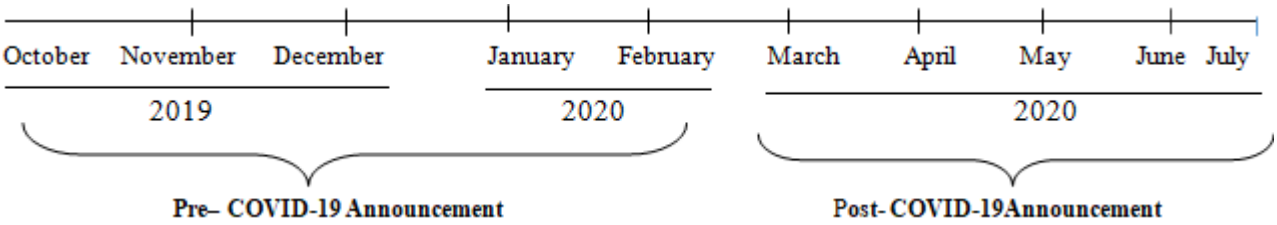

Figure 1: Pre- and Post – COVID-19 Periods
Source: Data from the field

3.3 Performance Measure

A benchmark based on the median industry is constructed and used. Industry-matching assumes that some of the cross-sectional variation in operating performance can be explained by an industry benchmark (Barber, 1996).

A firm's industry-adjusted performance is computed by subtracting the median performance of the industry comparison group from each firm's performance. The abnormal performance of firm *i* in year *t*, AP_{it}, is defined as realized performance, P_{it} , less expected performance, $E(P_{it})$.

$$AP_{it} = P_{it} - E(P_{it}) \quad (1)$$

where performance is measured using shares turnover, and expected performance is based on industry medians on those period pre-COVID-19 Pandemic.

4. Empirical Results

In this section we present the results. Table 3 shows DSE daily Turnover (shs 'million') for the period October 2019 to July 2020. We chose this period in order to show whether the performance was affected following the COVID-19 Pandemic. Since, we use the daily data, it is easy to compare performance from one month to another.

Table 3: Median Daily DSE Turnover for the period October 2019 – June 2020

Year	Months	Median Turnover (shs 'million)
2019	Oct	43.61
	Nov	95.84
	Dec	380.11
2020	Jan	467.14
	Feb	139.26
	March	15.07
	April	26.56
	May	3.66
	June	35.38
	July	21.77

Source: www.dse.co.tz

The table presents the median turnover of shares sold in DSE for the period shown in the table. The daily data was collected from the DSE website and are raw data.

The results in Table 3 show that the median turnover fell significantly from March 2020 and reached the lowest level in May 2020, where the median turnover was very low, TZS 3.66 million per month. These results suggest that the DSE stock performance significantly fell following the announcement of the COVID-19 Pandemic. The results are also presented in Figure 2.

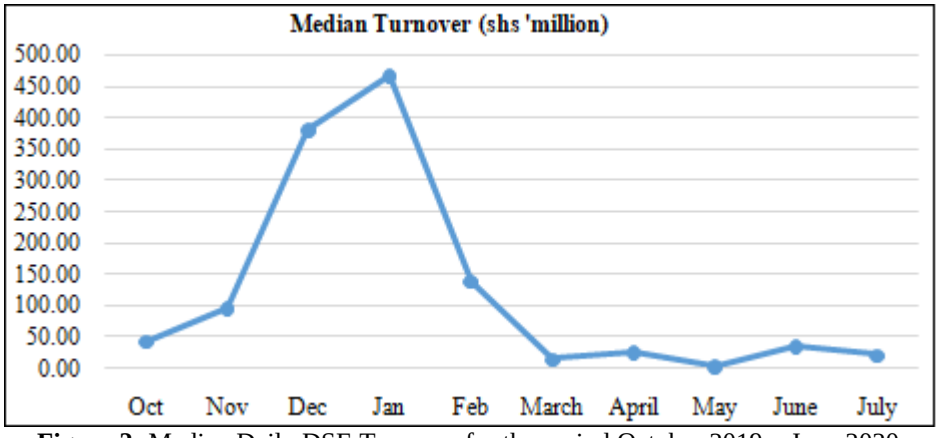

Figure 2: Median Daily DSE Turnover for the period October 2019 – June 2020

The results shown in Figure 2 show that the DSE turnover increased at increasing rate from October 2019 and peaked in January 2020 where more than median TZS 450 million was realized in the month. However, the trend changed and the performance started to fall and was very low in May 2020 where the median turnover was merely TZS 3.66 million. It should be remembered that WHO announced COVID-19 as Pandemic in March 2020. This is the same period the DSE performance was very low. These results suggest that the COVID-19 Pandemic has had negative

effect not only to the stock market but also to the economy in general.

The market seems to pick up in June 2020 but fell again in July 2020. This is the period when the Universities, Colleges, and Secondary Schools (Form Six only) opened. One can say that this is the period the investors' confidence was a bit increased and slowly the market (DSE) was picking up.

The analysis went further to compare the DSE performance in Jan – July 2020 relative to the same period in 2016, 2017, 2018 and 2019. These are the periods where there were no COVID-19, normal periods – thus expected performance, (Equation 1). This analysis helps us to determine the abnormal performance in the period following COVID-19 Pandemic. Thus, to test our hypothesis that there was no abnormal performance in the period following COVID-19 Pandemic. Table 4 presents the results.

Table 4: Abnormal Performance in the Period Following Announcement of COVID-19 Pandemic

Static	Difference between 2016 & 2020	Difference between 2017 & 2020	Difference between 2018 & 2020	Difference between 2019 & 2020
Median Turnover (shs 'million')	-446.50	-89.62	-167.145	-102.08
Standard Deviation	159	187	288	227.47
Range	466	492.83	842.96	624.29
Sum	-2859	-389.36	-1145.20	-99.99
P-value (95% confidence level)	0.000	0.000	0.000	0.000

The abnormal performance is computed as the realized performance in the period following COVID-19 Pandemic relative to the performance in the pre-COVID-19 Pandemic period. The period is January to July in each year for the years 2016 - 2020.

The results in Table 4 show that the difference median turnovers between 2020 and those in years 2016, 2017, 2018 and 2019 from Jan. – July were all negative at 5% or better level of significance. This is another evidence that the DSE Performance fell significantly in the period following COVID-19 Pandemic relative to the same periods in 2016, 2017, 2018 and 2019.

Our results are almost similar to the recent studies done on the effects of COVID-19 on stock performances. HaiYue Liu *et al* (2020) evaluate the short-term impact of the coronavirus outbreak on 21 leading stock market indices in major affected countries including Japan, Korea, Singapore, the USA, Germany, Italy, and the UK etc. Their findings show that the stock markets in major affected countries and areas fell quickly after the virus outbreak. They also found that countries in Asia experienced more negative abnormal returns as compared to other countries. Mdaghria *et al* (2020) analyzed Stock market liquidity, the great lockdown and the Covid-19 global pandemic nexus in MENA Countries and found that the global pandemic of coronavirus has decreased the stock market liquidity in both its depth and tightness dimension.

Surprisingly, Mazur *et al* (2020) report that natural gas, food, healthcare, and software stocks earn high positive returns, whereas equity values in petroleum, real estate, entertainment, and hospitality sectors fall dramatically in the US stock market. Heyden *et al* (2020) analyzed the market reaction on an announcement of COVID-19 outbreak using event study methodology. They found that stocks react significantly negative to the announcement of the first death in a given country. The same results were reported by Ashrafa (2020).

However, all the above documented findings were done in US, Europe and Asia. None was done in Africa. Africa is one of the emerging markets, the study like this helps to uncover the performance of emerging stock markets following major disasters and crises. This is, therefore, the first study to analyze the performance of the stock market in emerging markets following the outbreak of COVID-19. This is the main contribution of this article to the body of existing literature on performance of stock markets following the COVID-19 outbreak.

5. Conclusion

This article studies the impact of COVID-19 on DSE stock market performance. Using conventional t-tests and non-parametric Mann–Whitney tests, an empirical analysis is conducted based on daily return data of stock markets in the DSE in Tanzania. Evidence suggests that COVID-19 has a negative effect on the DSE performance. These findings contribute to the research in at least two important ways: First, we contribute to the studies which have examined the stock market response to different disasters and crises. For example, Gangopadhyay et al. (2010) examined the stock market reaction and share price behaviour around the hurricane Katrina in 2005. Becchetti and Ciciretti (2011) explored the stock market reaction to the global financial crisis of 2007–2009. Kowalewski and Śpiewanowski (2020) examined how stock market reacted to the mine disasters. We complement these studies by examining the stock market reaction to COVID-19 pandemic.

Second, we contribute to the recently emerging literature which examines the impact of COVID-19 on financial markets. In this regard, Baker et al. (2020) used textual analysis of news mentions and found that COVID-19 pandemic has resulted in the highest stock market volatility among all recent infectious diseases including the Spanish Flu of 1918. Alfaro et al. (2020) used data from the US and found that equity market value declined in response to pandemics such as Covid-19 and SARS. Al-Awadhi et al. (2020) employed firm-level data from China and examined the early impact of COVID-19 outbreak on share prices in China. Likewise, Zhang et al. (2020) found that COVID-19 has led to increase in global financial market risk. Extending this debate, we examine how stock market returns have responded to COVID-19 using data from the emerging markets, DSE.

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