The Impact of Inflation and Exchange Rate on Stock Market Returns in Tanzania

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Abstract:
The influence of exchange rate and inflation on stock market returns in Tanzania was investigated using monthly inflation and exchange rate data from the BOT and NBS, as well as monthly market returns from the DSE, over the period 2011 to 2020. This effect was investigated using the autoregressive distributed lag (ARDL), cointegration approach, and the error correction parameterization of the ARDL model. The results from the analysis show that in both the short-run and long-run, stock market return is impacted by inflation rate and exchange rate. Moreover, the empirical results demonstrate the significant negative impact of inflation rate and exchange rate in long run on stock market return while there is positive impact between stock market return and exchange rate and inflation at short run on the basis of the above analysis it can be conclude that two selected macroeconomic variables are relatively significant and likely to impact stock market return of the Dar es salaam stock exchange basing on their coefficients and their significance relationship both in short and long run impacts of which its consistence with theories .The outcome of this thesis discovered potential need to focus on impact of macroeconomic variables in designing monetary and fiscal policy of the country’s economy, since; the capital market does respond quickly to the arrival of new information.

Keywords: Stock Market Return, Inflations Rate, ARDL and Exchange Rate.

Introduction
The Dar es Salaam stock market is one of Africa's emerging economies; its stock market output is highly dependent on the existence of macroeconomic variables, as DSE acts as a mediator between saving and investing units, as well as a barometer for the Tanzanian economy. As a result, DSE has consistently lobbied the government to create a conducive policy environment. Dar es Salaam Stock Exchange was established in 1996 as part of the government's broader economic reforms aimed at stimulating a dynamic private sector to be the primary engine for economic growth in Tanzania. The DSE started business on April 15th, 1998 to support the Tanzanian Government to privatize parastatal entities to boost economic growth, reduce the number of non-performing parastatal enterprises and eliminate budgetary support (CMSA, 2020).

Since then, DSE has seen tremendous growth including an increase in the number of stockbrokers and an increase in the number of companies listed on the market. Among the securities traded on DSE include equities, bonds,
and shares. DSE started with only two companies in 1998 which were listed but currently, there are a total of 28 companies listed on the DSE. Also, the number of participants has increased from less than 100,000 in 1998 to more than 500,000 in 2019 from which more than 90% are foreigners. The DSE launched a second-tier market in 2013, the Enterprise Growth Market (EGM), with lower listing requirements; designed to attract small and medium companies with high growth potential. In 2015, the DSE changed its registration status from being limited by guarantee to being limited by shares. It is the third Exchange in Africa to demutualize after the Johannesburg Stock Exchange (JSE) and the Nairobi Securities Exchange (NSE). The DSE operates in close association with the Nairobi Securities Exchange in Kenya and the Uganda Securities Exchange in Uganda. Plans are underway to integrate the three to form a single East African bourse. (Mwenda, 2020). The relationship between stock market return with the exchange rate and inflation is imperative for investors because stocks are expected to provide security from the effects of inflation and exchange rate. Although various theoretical foundations provide mixed findings on the connection between inflation, exchange rate, and stock market returns. For instance, the proxy hypothesis illustrates that there is a negative relationship between inflation rate and stock market returns and also stock prices (Hiraki, 1985) which relate with the result of (Fama, 1981). However, the fisher theory presupposes that equity stocks present claims against real assets of a business and as such may serve as a hedge against inflation (Osagie&Emeni2015).

Several types of research have been also conducted to examine the effect of inflation and exchange rate on stock returns in both developed and developing economies around the world. A study by, (Mahmood 2014) examined the connection between inflation and stock prices in Pakistan and found that inflation is influenced negatively by pressure on stock prices. (Mahonye&Mandishara2014) examined the long-run relationship of stock returns and its determinants in Zimbabwe and established that inflation, real income, money supply, and exchange rate are the main determinants of stock market returns. In Tanzania, there are studies have which come up with inconsistent results on the relationship of macroeconomic variables and DSE return such as Gwahula (2018) Abdalla (2014).

The inconsistency of results from various researchers on the relationship between macroeconomic variables and stock market return is what drives the need for a similar study to be conducted. Specifically, to this time as our market is moving into the EAC integration market and at the same time our market is 80% dominated by foreign investors. Investors focus on two macro-economic variables as are the main catalyst of the situation at a time.

**Literature Review**

**Theoretical Literature Review**

The Purchasing Power Parity Theorem expounds on the connection of exchange rates with comparative goods' prices (Iambs et al., 2003).PPP theorem can be drawn in past in Spain to sixteen-century, though Swedish economist Cassel named the theory PPP first. Cassel at one point argued that in the deficit of it, all the ways would be meaningless in discussing a currency mispricing. Absolute PPP theory was presented first with aim of dealing with the good's price relationship with different currencies value Dwivedi (2002).

**Fisher Theory**

Fisher's context establishes the relationship between inflation and stock returns, The Fisher effect is a product of the economic theory by Fisher (1930), who sought to explain the relationship between returns and inflation. For most of the period from the 1930s to the 1970s, this theory was the logical explanation for the stock-inflation relationship, as it solidified the notion that assets underlying value are maintained in the face of inflation. However, Sharpe (2002) noted that during the 1970s investors found the Fisher theory to fall to explain in the short and intermediate terms, as stock returns were negatively related to inflation.
Empirical Literature Review

(Kwofie & Kwame, 2018), Examined the effect of exchange rate and inflation on stock market returns in Ghana using monthly data from January 2000 to December 2013 obtained from the Bank of Ghana and GSE. The result of the study showed that there exists a significant long-run relationship between GSE market returns and inflation. However, no significant short-run relationship between them existed. The result also showed a significant long- and short-run relationship between GSE market returns and exchange rate. Also in the other study of (Khan & Kamran, 2019), investigate the influence of exchange rate on the stock returns of the Shenzhen stock exchange using monthly data from January 2008 to December 2018. By accessing the long run and short run relationship between stock return and exchange rate by using ARDL. The study found that the exchange rate has a negative and significant influence on the stock returns of the Shenzhen stock exchange while Inflation and interest rate results indicate a negative and statistically significant effect on the stock returns. But according to (Uwubanmwen, 2015), exploring the impact of inflation rate on stock returns in the Nigerian Stock Market, monthly data covering the period 1995 to 2010 were used to access the relationship between stock return and inflation also its look if stock prices affect inflation by using ARDL. The result indicates that the inflation rate has a negative but weak impact on stock return.

Another study by (Khon & Xaisongkham, 2018) examined the relationship between the exchange rate and stock prices of Cambodia security exchange (CSX) by using monthly data of stock prices and exchange rate from 2015-2018. The results show that two variables Exchange rate and stock prices have no relationship in the short-run but in the long run, they are associated with significance. The Granger causality test revealed that stock prices and exchange rates are independent. According to the study of (Laichena & Obwogi, 2015) Who Investigated the effects of macroeconomic variables on stock returns in the East African community stock exchange market, On one hand, the broad aim of the study was to identify the effects of macroeconomic variables on stock returns in East Africa. From the results, there was a significant relationship between the macroeconomic variables in the study and stock returns in East Africa. The study recommends that policymakers in East Africa should make efforts towards improving the macroeconomic conditions of the region to improve stock returns. The related study of (Ayoyi & Renson, 2016) examines the impact of financial markets in trying to influence the magnitude and direction of economic growth within East Africa. The study conducts a systematic review of literature papers in the field of financial markets analysis. And recommend that Governments especially in less developed countries need to enhance and develop robust financial markets to realize the full potential of foreign direct investment. That Financial markets act as linkages between the foreign financial markets and the economy. Later (Kim, J. H., Ji, 2015) examines the Fisher hypothesis and its examination of the relationship between stock returns and inflation by using the wavelet analysis and hence examines nominal and real stock returns and inflation over the different time scales. The results of the regression analysis in the wavelet domain and the wavelet correlation show that the relationship was positive at the short horizon. Other results indicated that in all regression analyses, real returns have a significant negative relationship with inflation except for the shortest time scale (d1) and the longest smooth scale (s7) in wavelet analysis. Also, according to (Lee, 2009) Examine whether the stock return and the inflation relation are indeed due to inflation illusion by examining the hypothesis using a longer sample period of the US and international data. The result found the two types of stock return and inflation relations without imposing a particular permanent and temporary restriction on the two types of shocks. From empirical studies have shown that scholars around the world and have come to a different conclusion. So many studies like that of (Kwofie & Kwame, 2018) & (Khan & Kamran, 2019) has shown that inflation and exchange rate have a long-run effect on stock market return but while in the short run only exchange rate has an effect. On the other hand studies of (kulathunga, 2015) & (Khon &
Xaisongkham, 2018) show that both inflation and exchange rate has a long-run and short-run effect on stock market return. This also difference exist in the study of Gwahula (2018) and Abdalla (2014) which were carried in Tanzania. Due to that reason researcher want to know what is the situation in the Tanzania Stock market, furthermore since some of the macroeconomic variables (inflation, exchange rate) used in the past studies have undergone changes owing to the constant changes in the economic climate it will be imperative to conduct another study to establish the current effect of the exchange rate and inflation on the stock markets returns for firm listed on the Dar es Stock market.

Methodology
This part depicts the study mechanism deployed to reach the result in exploring the effect of inflation and exchange rate in stock return at Dar es Salaam stock exchange in the context of helping investment and capitalization enlargement. The study adopts the unit root test, ARDL, and Johansen's Test to test the magnitude and to study the long run and short run relationship of stock return in DSE as interacted by key variables, inflation rate, and exchange rate. The 120 months' secondary data have been collected, starting from Jan 2011 to December 2020 from the Bank of Tanzania, DSE, and Tanzania Bureau of statistic publications.

Variables and Measurement
In this study, independent variables comprise the exchange rate and inflation rate while the dependent variable includes the stock market return. The Table below indicates variables (independent and dependent variable) and measurement of variables.

Data Analysis and Procedures
Data has been analyzed by using E-views Software which is one of the powerfully statistical packages for Quantitative data analysis and since its primary function was built for econometrics. Then study employs descriptive which helps to give the general picture of the data set and time series analysis that has been used to examine how the changes associated with the chosen data point compare to shifts in other variables over the same period.

Model Specification
The study use model developed by, (Kwofie & Ansah, 2018) and specify the Stock Market Return is the function of exchange rate and inflation. Thus, the estimated equation is:

\[ \text{Stock Market Return} = f(\text{Exchange rate, Inflation}) \]

This gives our estimated regression model as follows:

\[ \ln \text{SMR}_t = \beta_0 + \beta_1 \ln \text{rr}_t + \beta_2 \ln \pi_t + \mu_t \]

Where SMR is the Stoke Market return, \( \ln r r_t \) is the exchange rate, \( \ln \pi_t \) is the Inflation and \( \mu_t \) is the error term.

Results
Long-run Relationships: Johansen Maximum Likelihood Co-Integration Test
Johansen test of co-integration was used to test the relationship between inflations rate, exchange rate, and stock market return. Two variables are said to be co-integrated if they have a long-term, or long-run equilibrium, the relationship between them. Results in Table indicate the rejection of the null hypothesis of no co-integration and thus, we accept the null hypothesis that there are at most two equations in the model. This implies there is a long-run relationship between stock return, inflations rate, and exchange rate in Tanzania. The results confirm variables are co-integrated. As there is two co-integrating equation found, there is causality in at least one direction.
**Table 1. Unrestricted Cointegration Rank Test (Trace)**

<table>
<thead>
<tr>
<th>Hypothesized</th>
<th>Trace</th>
<th>0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of CE(s)</td>
<td>Eigenvalue</td>
<td>Statistic</td>
</tr>
<tr>
<td>None *</td>
<td>0.151241</td>
<td>30.91237</td>
</tr>
<tr>
<td>At most 1</td>
<td>0.068402</td>
<td>12.05473</td>
</tr>
<tr>
<td>At most 2 *</td>
<td>0.033399</td>
<td>3.906539</td>
</tr>
</tbody>
</table>

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

**Table 1. Unrestricted Cointegration Rank Test (Maximum Eigenvalue)**

<table>
<thead>
<tr>
<th>Hypothesized</th>
<th>Max-Eigen</th>
<th>0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of CE(s)</td>
<td>Eigenvalue</td>
<td>Statistic</td>
</tr>
<tr>
<td>None</td>
<td>0.151241</td>
<td>18.85764</td>
</tr>
<tr>
<td>At most 1</td>
<td>0.068402</td>
<td>8.148188</td>
</tr>
<tr>
<td>At most 2 *</td>
<td>0.033399</td>
<td>3.906539</td>
</tr>
</tbody>
</table>

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

**Error Correction Model Regression Results**

The results of R² = 74.96% is significant level to explain about the model. This is interpreted as that; the variation in stock return can be influenced by the inflation and exchange rate. Thus, the identified independent variables explain the dependent variable stock return to the extent of 74.96%. Other unidentified factors can explain the stock return for only 25.04%. The value of Durbin-Watson of 1.92088 indicates there is a positive relationship among the variables included in the model.

Table 2 represents estimation results. It is observable that all the variables which are Inflations rate and Exchange rate are statistical significance at 5%.

According to results in Table 2 a percentage change exchange rate is associated with 0.416834% increase in stock return in the short-run at 5% significance level. Hence exchange rate and stock return in Tanzania have positive relationship which means increase in exchange rate leads to increase in stock market return. A percentage change in inflation is associated with a 0.188% increase in stock market return in the short-run at 5% significance level. Hence stock return and inflation have positive relationship which means increase in inflation led to increase in stock market return in Tanzania in short run.

**Table 2. Regression Analysis Results**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflation</td>
<td>0.188162</td>
<td>0.049936</td>
<td>-3.768077</td>
<td>0.0003</td>
</tr>
<tr>
<td>Exchange rate</td>
<td>0.416834</td>
<td>0.160220</td>
<td>2.601641</td>
<td>0.0105</td>
</tr>
<tr>
<td>C</td>
<td>4.742267</td>
<td>1.285014</td>
<td>3.690440</td>
<td>0.0003</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.749679</td>
<td>Mean dependent var</td>
<td>7.566583</td>
<td></td>
</tr>
</tbody>
</table>
### The Model

\[
\text{RETURN} = 0.188162092031 \ln \pi_t + 0.416834024022 \text{lnerr}_{t} + 4.74226668719
\]

### Discussion

The order of integration of the variables under study was investigated using graphs and the ADF test. It was realized that the DSE, inflation and exchange rate were non-stationary at level. DSE, Inflation and exchange rate become stationary after first difference, implying that they are each integrated of order one. The bounds test of the ARDL model showed that the DSE market returns and inflation are cointegrated. The result also showed the existence of significant negative long-run relationship between the DSE market returns and inflation. The coefficient of inflation showed that a one percent rise in inflation can lead to approximately 12.6 decrease in stock market return in the long run. The result means that investors are losing for inflation increases in the long run. The coefficient of the error correction model of -0.188 (p=0.0003) is significant with its value, suggesting a moderate speed of convergence to equilibrium. The coefficient of inflation in the error correction model showed significant short-run relationship between DSE market returns and inflation. This means that there is short run relationship between DSE market returns and inflation and one percent rise in inflation may result to 18 percent increase in return. The result of the long-run relationship between the DSE market returns and exchange rate showed a significant negative relationship. The coefficient shows that 1% appreciation in the TZS against the dollar will lead to an approximately 11.6% decrease in stock return in the long run. This may be due to the decrease in flow of foreign investment. The error correction coefficient estimated at 0.417 (p=0.0105) was also statistically significant. The result also showed a positive short run relationship between stock market returns and exchange rate. This means that in the short run changes in exchange rate can have a significant impact on the DSE market returns. The study found that exchange rate and inflation affect positively stock market return both in short run and in Tanzania market perspectives but also the results shows that inflations and exchange rate have negative impact on stock market return in long run. Based on the results generated exchange rate and inflation are the most determinants influence on the stock market return in Tanzania as they have higher influence on stock market return. This study is in line with that done by (kulathung, 2015)& (Khon & Xaisongkham, 2018) shows that both inflation and exchange rate has long run and short run effect towards stock market return.

### Conclusion

Stock market return in Tanzania has improved in recent years, but the progress has been slow and in fact, it falls behind when compared to some other developing countries, this paper examines the impacts of inflations and exchange rate on stock market return in Tanzania. The results from the analysis show that in both the short-run and long-run, stock market return is impacted by inflations rate and exchange rate. Moreover, the empirical results demonstrate the significant negative impact of inflations rate and exchange rate on the basis of the above analysis it can be conclude that two selected macroeconomic variables are relatively significant and likely to impact stock market return of the Dar es salaam stock exchange basing on their coefficients and their significance.
relationship both in short and long run impacts of which its consistence with theories.

**References**


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