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The Sensitivity of Tanzanian Private Investment to Interest and Exchange Rates

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Abstract

This study examines the impact of interest and exchange rate volatility on private investment in Tanzania. The role of interest and exchange rates in the economy has been discussed. Interest and exchange rate volatility is known to have a significant effect on key economic variables; but whether it also affects private investment in Tanzania remains a puzzle. The study covers the period of 25 years from 1991 to 2015 and employed the Generalised Method of Moment (GMM) as a method of estimation. The results suggested that the interest rate has no effect on private investment compared to the exchange rate. This remains interesting considering that the interest rate is a key parameter in defining money supply in the economy. The results raised an important view that using a price strategy in monetary policy may not have a significant effect on the private sector; hence, there is a need to engage a pool of stakeholders to accommodate a diverse policy decision.

Keywords: Exchange rate, interest rate, monetary policy, private investment.

Introduction

This paper examines the impact of interest rate and exchange rate on private investment in Tanzania. The interest rate, exchange rate and investments are among the key macroeconomic variables in any economy. Both the interest and exchange rates are subjected to changes overtime, though this is more uncertain in developing countries relative to developed countries (Soleymani and Akbari, 2011). Furman et al. (1998) state that, for the open economies, the link between the interest and exchange rates is even much stronger than the link between the interest rate and money supply. This argument signifies a combined use of

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interest and exchange rates in a single study. Besides, due to potential threats of instability from unfavourable changes in interest and exchange rates, there have been multiple studies and efforts that were made by governments and international organisations to establish and maintain stability.

Keynesian theory recognises the interest rate as a key factor for investment as it affects money supply and hence cost of capital (Appelt, 2016). The slight change in interest rates could have an adverse effect on investment and savings of economic agents. This is asserted from the fact that most private investments are financed by banks' loans, the corporate sector, or household savings. The interest rate is the key factor in defining the opportunity cost of an individual to undertake certain risk investment and forego less risky investment (Markowitz, 1952). However, there are two mixed schools of thought regarding the impact of the interest rate on investment. The early work of Jorgenson 1963 stated that the desired stock of capital is a function of output and opportunity cost of capital (Osundina and Osundina, 2014), such that the desired level of capital stock is directly related to output, but inversely related to the opportunity cost of capital. Consequently, the decrease in interest rate reduces the opportunity cost of capital, and hence, raises the desired level of capital stock and investment spending. Following the advocacy of low-interest rate for stimulation of investment, developing countries kept interest rate excessively low.

Ronald (1973) and Shaw (1973) argued that low-interest rate is detrimental to savings and hence investment demands. This is supported in the study by Osundina and Osundina (2014) that low real interest rate prior to 1986 resulted in low savings, investment and economic growth. Besides, Asare (2013) stated that an increase in interest rate raises financial savings and consequently leads to the increase in the amount of credit available for the private sector investment. He further argued that increased credit also has a positive influence on the speed of adjustment from the actual capital stock to the desired capital stock.

In contrast, the exchange rate has an influence on investment due to its role in the domestic price level, the profitability of traded goods and services as well as allocation of resources (Taiwo and Adesola, 2013). The link of the exchange rate and investment may be direct or indirect; whereas the direct link is either through

export sales or importing foreign produce. The appreciation of local currency makes local produce expensive relative to foreign goods; as a result, firms respond by increasing investment. The effect of exchange rate on investment may be through the price of imports, where depreciation of the currency makes capital goods importation more expensive; hence, it may lead to high costs of production in domestic goods.

The linkage between interest rate, exchange rate and investment can be traced from the Mundell-Fleming Model, which is an extension of the Investment Savings-Liquidity Preference Money Supply (IS-LM) model. The Mundell-Fleming Model provides a theoretical relationship between interest rate, exchange rate and output in an open economy as opposed to a traditional IS-LM model, which focuses only on the relationship between interest rate and output (Osundina and Osundina, 2014). This section discusses the theoretical effect of monetary policy in the Mundell-Fleming Model under the floating exchange rate framework. In the open economy, there is a link between interest and exchange rates. Using the Mundell-Fleming model framework, the increase in money supply causes the fall of local interest rate below the global interest rate. This forces the capital outflow and therefore, depreciation of the local currency. However, depreciation of the local currency makes local goods cheaper than foreign ones, thus increasing exports and decreasing imports. Consequently, with time, an increase in net exports shifts Investment Savings (IS) curve to the right which may equalise the local interest rate to the global interest rate. This is because the lower the rate of interest, the higher the level of output; that is, the decision to invest is based on the cost of capital and expected rate of return such that the lower the rate of interest, the higher the level of investment.

The Mundell-Fleming model also showed the effect of fiscal policy. The model asserts that expansionary fiscal policy (i.e. increase in government spending) is likely to increase the local rate of interest rate above the global rate. Accordingly, this will attract more capital inflow and cause the appreciation of the local currency. As a result, local products become expensive relative to the foreign goods, hence decreasing the net export. This process will cause the return of the IS curve to the original level, or equalise with the global interest rate, whereas,

the contraction fiscal policy is likely to give the exact opposite result of the expansionary policy.

It is therefore against this background that this study examines the empirical link between exchange rate, interest rate and private investment in Tanzania. The private investment discussed in this study refers to the portion of gross fixed capital formation undertaken by the private sector (including private non-profit agencies) for the expansion of its domestic fixed assets. The fixed capital formation refers to purchases of fixed assets of the economy plus the net changes in the level of inventory (see World Bank Report, 2018).

Investment activities may be undertaken by both the public and private sectors. The government is mainly involved in the autonomous investment, which acts as a major driver of another type of investments in the economy. These investments can either be social/soft i.e. education, health and house, or infrastructure or hard i.e. transport, power and water. Other investments may purely be economical, which the private sector undertakes for capital accumulation. There have been studies that associate economic growth with growth in private investment (for example, Ghura and Hadjimichael, 1996; Azam and Daubree, 1997; Ghura, 1997 cited in Ugochukwu and Chinyere, 2013). These studies suggested that the private sector investment influences more economic growth compared to public investment.

Despite enormous studies on the determinants of private investment–to the authors' knowledge–there is no empirical study that explicitly studied the interest rate, exchange rate and private investment together in the Tanzanian context. Similarly, whether the two may have an impact on the latter remains an unresolved area of interest that the authors of this paper wished to explore. This research gap is apparent in the literature review section . Additionally, the current study is of significance to policy makers, especially on the use of interest and exchange rates as policy instruments to stabilise private investment in Tanzania. This is in line with the recent intended policy shift from the use of reserve money as an operational target since 1993 to the interest-based framework. The BoT report of 2016 shows that recently the central bank has embarked into the transition of shifting to the interest-based framework.

Profile of Interest and Exchange Rates in Tanzania

The interest and exchange rate policies in Tanzania have undergone significant changes during the 1990s. Until 1992, the interest and exchange rates were administered and fixed respectively; during which there was macroeconomic instability. The Foreign Exchange Act of 1992 allowed abandonment of the fixed exchange rate regime and the adaptation of the floating exchange rate regime (BoT-Tanzania, 2016). This marked the establishment of bureau de changes to participate in Inter-Bank Foreign Exchange Market (IFEM). As a result, the foreign exchange market was stabilised by the removal of the parallel market and facilitated market-determined foreign exchange rate (see Mndeme, 2015). Despite the considerable achievements in the foreign exchange market, Tanzania is still experiencing deficit external position (see Mndeme, 2015). However, a 2013 OECD report shows that financial sector liberalisation has promoted domestic private investment.

Figure 1 shows the movement of private investment as a share of GDP from 1993 to 2015. The share of private investment in GDP has increased from 17% in 1993 to 27% in 2015. However, twists and turns were experienced between 1993 and 2015; i.e. private investment as a share of GDP decreased in the early years of reforms from 17% in 1993 to 11% in 1997. To curb the decrease, a number of efforts were taken to promote private investment. These include the introduction of the National Investment Promotion Policy in 1996 and the enactment of the Tanzania Investment Act in 1997. These efforts opened almost all sectors to foreign and private participation (OECD, 2013). As result, the share of private investment in GDP has never gone below 20% from 2007 to 2015.

Although a separate analysis between private investment and GDP growth shows that GDP has positive growth trend, private investment indicates highly volatile with negative growth in few years, that is 1995, 1996, 1997, 1999, 2002 and 2009 (see Figure 2). This highlights the need for more analysis related to private investment to ensure the increase of its share, or an influence on the growth of GDP in Tanzania.

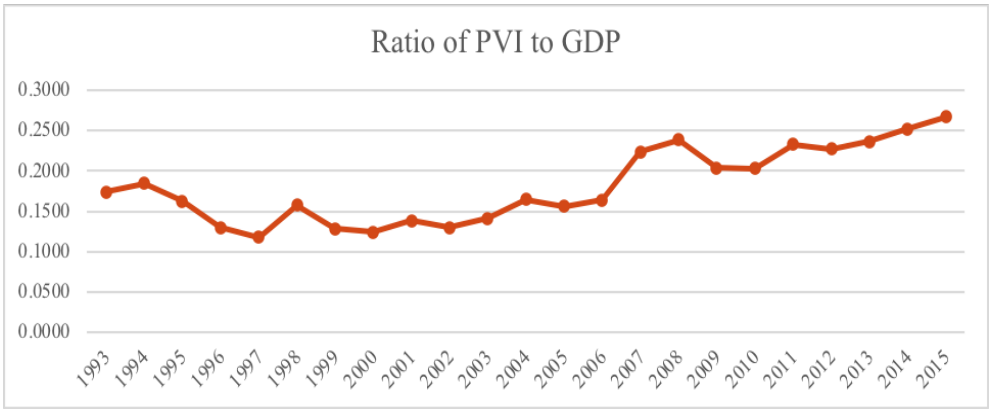

Figure 1: Ratio of Private Investment to GDP in Tanzania (Source: Authors)

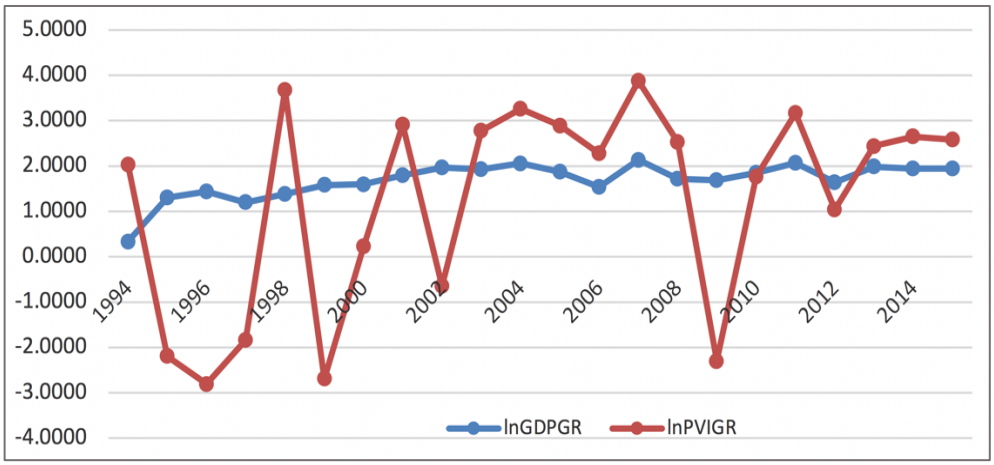

Figure 2: Trend of Growth of GDP and Private Investment in Tanzania (Source: Authors)

Figures 2 and 3 reveal that movement of private investment is closely related to movement in the nominal exchange rate but not the real exchange rate. In this case, an increase in private investment goes with the nominal depreciation of Tanzanian currency. Similarly, nominal interest rates were found to have an inverse relation with the movement of private investment. Thus, this study provides empirical evidence on the significance of mutual relation of gross private fixed investment, interest rate and exchange rate in Tanzania.

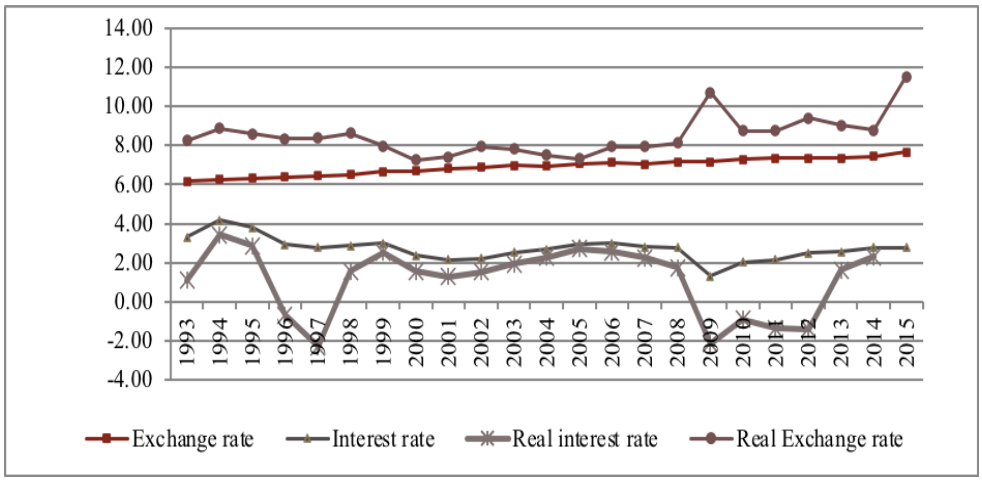

Figure 3: Exchange Rate and Interest Rate in Tanzania (Source: Authors)

The paper is organised in five sections: Section one is the introduction which briefly describes the theoretical link between exchange rate, interest rate and investment. Section two presents existing literature related to the topic. Section three is devoted to describing data, models and methods used in the analysis, while the empirical results are presented and discussed in section four. The last section comprises the conclusion, policy implication and suggestion for future studies.

Literature Review

The term investment has a different meaning for economists and bankers. For economists, investment means the transaction that increases the magnitude of real aggregate wealth in the economy (Parker, 2009). Unlike bankers, they consider investment as an accumulation of nominal value in terms of financial value or individual wealth. This means that the purchase of financial assets such as stocks and mutual funds is considered to be an investment. Nonetheless, interest and exchange rates are important economic variables that shape the direction and policy on investment and the entire economy. This review focuses on interest and exchange rates in relation to investment.

The interest rate is conventionally defined as the price for money in macroeconomics literature. In finance, it is also defined as the cost of borrowing funds or return for investing in a particular financial asset (Markowitz, 1952).

Moreover, the interest rate may be considered alongside the exchange rate due to the free movement of capital across countries. Several studies have discussed the theoretical work on the channels through which the interest and exchange rates can impact investment. However, the direction and magnitudes of the impact of some of the factors are not in consonance. As a result, even on the theoretical ground, signs of the relation between the exchange rate, interest rate and investment remain ambiguous.

Interest rate analysis may help or support the prediction of macroscopic economic aspects. The interest rate is linked to investment as the opportunity cost of investment. Under the unchanged conditions of investment, the rising interest rate increases the costs of investment; as a result, the demand for investment is reduced (Khurshid, 2015). However, the empirical literature shows different scholars have drawn different conclusions on the link between interest rate and investment. Some scholars found a positive correlation between interest rate and investment, while, others found no evidence of the significant link between interest rate and investment, which is contrary to the traditional theory. Examples of the studies which found a significant impact of interest rate on investment include Qing and Chong (2004) as cited in Khurshid (2015) who found that if the investment is endogenously added into the monetary utility function, the investment has an impact on the interest rate. Besides, Ingersoll and Ross (1992) discovered that the interest rate has an impact on investment in the real option model. These findings highlight the interdependence relation between interest rate and investment.

Moreover, changes in the exchange rate may affect investment through three channels: firms export sales, firms purchases of imported capital goods and competitiveness of domestic goods in the foreign market or imported goods in the domestic market (Baltar et al., 2016). The effect of exchange rate on investment may be classified in a number of ways. First, the exchange rate affects investment through domestic or exports sales. The depreciation of the currency causes domestic goods to be cheaper than the imported goods; thus, the demand for domestic goods increases domestically as well as in the foreign market. As a result, firms respond by increasing investment on capital and labour. Second, the exchange rate affects investment if currency depreciates and hence increases the prices of imports. That is, the costs of production may go up if production, in

part or in full depends on capital goods from a foreign market. Therefore, Soleymani and Akbari (2011) argued that the impact of exchange rate on investment is not obvious because it depends on which of the mentioned scenarios prevails and value of elasticity of demand.

Mundell-Fleming provides a view on the link between interest rate, exchange rate and investment. The model asserts that the increase in interest rate is necessary to stabilise exchange rate depreciation and curb inflationary pressure. The increase in interest rate makes financial assets more attractive to the investors; as a result, it leads to capital inflows and limits exchange rate depreciation. However, the East Asian crisis of 1997-1998 and the failure of the high-interest policy raise concerns regarding the credibility of the high-interest policy in defending exchange rates (Dash, 2012). Perhaps, the high-interest policy imperils the ability of domestic banks and firms to payback the external debts; this may lead to capital outflows and depreciation of the exchange rate.

The link between interest and exchange rates on investment is also reflected in the IS-LM model. Investment is the function of the output and interest rate; whereas investment is considered to have an inverse relation to the interest rate but a direct relation with the output (Muhammad et al., 2013). The IS-LM model propounded by John Hick in 1937 and later extended by Alvin Hansen in 1941 discusses the link between goods and financial markets. The goods market is described by IS curve which states the level of output for a given level of interest rate when the goods market is in equilibrium, in which the lower the rate of interest, the higher the level of output. The main reason for the decision to invest is based on the cost of capital and the expectedrate of return, such that, the lower the rate of interest the higher the level of investment. Consequently, if the interest rate goes down, it is likely that more investment will be viable, hence more output; and additionally, more likely to reduce the level of unemployment.

There are two possible ways for the changes in investment, either changes in interest rate (causing movement along the IS curve) or in autonomous spending (causing shift of IS curve). Accordingly, when considering a change in the interest rate effect on investment, it should be clear that the interest rate has more effect not on autonomous investment, but rather on investment depending on the interest rate. Besides, The LM curve illustrates all combinations of interest

rates and levels of output that occur when the financial market is in equilibrium. The financial market is in equilibrium when the demand and supply for money are equal. The supply of money is determined by the central bank of a particular country, whereas, the demand for money is determined by the level of income. If there is an increase in income, there will be an increase in demand for goods and services. Consequently, there will be an increased demand for money and hence an increase in the level of interest rate. Within the monetary policy, if there is an expansionary policy, there will be an increase in money supply; then, the government will buy bonds which will lead to an increased price of bonds and a decrease in interest rate. The fall in interest rate causes an increase in investment and hence an increase in aggregate demand, leading to the growth of production. However, when dealing with fiscal policy, the initial effect is on the goods market, then spreading over to the financial markets, and then back to the goods market. An increase in government spending increases demand for goods and services, which leads to the increase in the level of output. If there is an increase in output, it is likely to have more impact on private consumption expenditure and investment expenditure.

The option theory highlights the need for stable interest and exchange rates for the sustainable investment environment. The theory states that when investment is irreversible, an increase in uncertainty may cause postponement of investment. Within the framework of this theory, the investment will only continue if the net present value will exceed the value of the option to postpone (Soleymani and Akbari, 2011; Bekoe and Adom, 2013). The importance of stable movement of interest and exchange rates is on promoting investments as the uncertainty of these variables is likely to contribute towards the flow out of investments or postponement of several investments. This view is supported by Pindyck and Salimano (1993) findings that real exchange rate instability has a significant negative impact on investment in both developing and developed nations. Although Golberg (1993) found no significant impact of unstable real exchange rate on an aggregate level, yet on sub-sectors level, she found varying significance and signs.

The brief review of empirical studies revealed non-uniformity in terms of sample size, methods, models and variables employed in exploring the relationship between exchange rate, interest rate and private investment. Muhammad et al.

(2013) used the Johansen cointegration test and Error Correction Model to analyse the impact of interest rate on investment in Pakistan. They employed a sample period of 49 years from1964 to 2012. Variables applied in this study include the gross fixed capital formation which was used as a proxy for investment (and treated as the dependent variable). Other variables that were treated as independent variables include: i) GDP used as a proxy of income; and ii) Real interest rate as defined by actual interest minus the current rate of inflation. Muhammad et al. revealed that lenders, borrowers and savers care much for the real interest rate relative to the actual rate. They also found that investment has an inverse relation with the interest rate.

Moreover, Osundina and Osundina (2014) used simple Ordinary Least Square (OLS) to analyse the link between the interest rate and investment decision in Nigeria. They treated the interest rate as a dependent variable and investment, government spending, GDP, public debt as well as exchange rates as independent variables. This study found no evidence on the relationship between interest rate and investment in Nigeria. This highlights the interdependence between the interest rate and investment; however, the study ignored the link of the exchange rate to the interest rate and investment.

Bekoe and Adom (2013) used the exchange rate in their study. The study explored the relation between macroeconomic instability and private investment in Ghana. It was found that all macroeconomic uncertainty indicators are significant and negatively related to private investment with exception of the real exchange rate. Nevertheless, Soleymani and Akbari (2011) studied the impact of exchange rate uncertainty on domestic investment. They used a fixed effect panel estimation model which revealed the negative relation between exchange rate uncertainty and investment as a share of GDP in fifteen Sub-Saharan African countries. The study used GARCH (1,1) to obtain uncertainty of exchange rate of each country. Dash (2012) expressed foreign exchange rate as a function of interest rate, inflation differential, net intervention of the central bank, constant and time. Methods that were used in this study are cointegration analysis, error correction, impulse response analysis, variance decomposition, and granger causality.

Therefore, the discussion of the current study shows that neither theoretical nor empirical review of literature is conclusive regarding the link between interest rate, exchange rate and investment. This justifies the need for continued studies on examining the impact of the interest and exchange rates on private investment. Based on the reviewed literature, the current study developed the following hypotheses:

Hypothesis 1: *The impact of exchange rate appreciation on private investment is negative.*
Hypothesis 2: *The impact of exchange rate depreciation on private investment is positive.*
Hypothesis 3: *The impact of the rise in interest rate on private investment is negative.*
Hypothesis 4: *The impact of a fall in the interest rate on private investment is positive.*

Description of Data, Methods and Models

The study uses annual time series data from 1993 to 2015. This period was chosen because it was the time where the role of the private sector in the economy was deepened due to financial sector reforms. Nonetheless, it is worth noting that the year 2015 is considered as a terminal year due to unavailability of data thereafter.

The discount rate is used as a proxy of nominal interest rate. Both the nominal interest and the nominal exchange rates are sourced from BoT's 50 Years' Anniversary Report. The exchange rate used in the analysis is the Tanzania shillings against the USA dollar. The other variable is gross private fixed capital formation (PVI) which is sourced from world development indicators. This variable stands as a measure of private investment. The PVI refers to purchases of fixed assets of the economy plus the net changes in the level of inventory by the private sector. The data profile shows that share of PVI in the gross fixed capital formation (GFCF) was above 60% during the whole period of the study (with an average of 73%). The study also uses public expenditure and imports as controlling variables.

Model Specification

To investigate the impact of interest and exchange rates on private investment, the study employs a model developed by Bean (1981) and used in a number of studies such as Darby et al. (1999) and Bekoe and Adom (2013). The model is presented in equation 1.

$$I_t^* = \beta_0 + \beta_1 Y_t + \beta_2 C_t + \varepsilon_t \quad \text{(1)}$$

Where: I* is the desired investment, Y_t is the output level, C is the cost of capital, β_0 is a constant and β_1 and β_2 are coefficients for output and cost of capital, which are expected to be positive and negative respectively.

Bekoe and Adom (2013) assert that the model is based on simple acceleration model for a long-run determination of investment. The use of output as an explaining variable may also be supported with investment accelerator theory which suggests that the investment may either be induced by an increase in output (investment accelerator) or resulting from the relationship between current demand (consumption multiplier) and stock of capital available (Robinson, 1979). However, Bekoe and Adom (2013) expanded equation 1 to a partial adjustment model as presented in equations 2 and 3.

$$I_t - I_{t-1} = \lambda(I_t^* - I_{t-1}) \quad \text{(2)}$$

$$\lambda I_t^* = I_t - (1 - \lambda) I_{t-1} \quad \text{(3)}$$

Whereas λ is a short run adjustment process, the larger the λ, the shorter the period of adjustment to attain a long-run equilibrium. In this case, if λ approaches one meaning, no more adjustment would be required because the actual change in investment will be equal to the desired change. Equation 2 implies that to achieve the equilibrium level, the actual change of variable from time t-1 to t should be equal to the desired change from time t-1 to t. However, the actual change is practically only a fraction of the desired change; hence equilibrium needs full adjustment to change. Equation 4 is the substitution of equation 3 into 1.

$$I_t - (1 - \lambda) I_{t-1} = \lambda\beta_0 + \lambda\beta_1 Y_t + \lambda\beta_2 C_t + \lambda\varepsilon_t \quad \text{(4)}$$

The expansion offers the dynamic model which shows the short-run adjustment process to a long-run equilibrium. Equation 4 can be rearranged as equation 4a.

$$I_t = \lambda\beta_0 + (1 - \lambda) I_{t-1} + \lambda\beta_1 Y_t + \lambda\beta_2 C_t + \lambda\varepsilon_t \quad \text{(4a)}$$

Equation 4a indicates that the lag value of the investment is also the determining variable of current investment. The inclusion of the lag value of the investment as a determining variable of current investment, is also cited from Soleymani and

Akbari (2011). Hence, equation 4a is an Autoregressive Model (AR); a model is treated as AR if it includes one or more lagged values of the dependent variable (Gujarati, 2004, p.656). Besides, equation 4a is simplified as presented in equation 4b.

$$I_t = \alpha_0\beta_0 + \alpha_1 I_{t-1} + \alpha_2 Y_t + \alpha_3 C_t + v_t \quad \text{.....(4b)}$$

From equation 4a, $\alpha_0 = \lambda\beta_0$, $\alpha_1 = (1 - \lambda)$, $\alpha_2 = \lambda\beta_1$ and $\alpha_3 = \lambda\beta_2$ are specified as short-run multipliers and $v_t = \lambda\varepsilon_t$ is a random error term which is assumed to be free from autocorrelation. The short-run multipliers are used to derive the long-run multiplier as: $\beta_0 = \frac{\alpha_0}{\lambda}$, $\beta_1 = \frac{\alpha_1}{\lambda}$ and $\beta_2 = \frac{\alpha_3}{\lambda}$

Therefore, this study uses the model expressed in equation 4b to investigate the impact of interest and exchange rates on private investment; whereas *C* is replaced by interest and exchange rates to capture the cost of capital and other standard determinants of investments as identified earlier on the review of the literature. The standard determinants of investments used in this study include current and lagged GDP following conventional accelerator theory.

Estimation, Findings and Analysis

The study uses the econometrics method and model to examine the impact of interest rate and exchange rate on the private investment in Tanzania. The choice model and method were based on objectives, data set, the hypothesis to be tested, nature and limitation of the data, assumptions and limitations of the method itself. In this case, the Generalised Method of Moment (GMM) is used for estimation to account for endogeneity (see Mndeme, 2015; Baltar et al., 2016). This follows the explained interdependences of the exchange rate and interest rate in the review of the literature. The GMM is based on the assumption that instrument variables are uncorrelated with the error term (Baltar et al., 2016).

It is a standard practice in the econometrics of time series to first examine whether the series are stationary or not; hence, the study used Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) for unit root test. It is also a standard practice to test for Cointegration to examine the possibility of two or

more variables to have a cointegrating relationship (Dash, 2012). These two initial tests (the stationarity and cointegration tests) are designed to prevent inaccurate estimations. Results of unit root test are presented in Table 1. All variables found to be stationary at level.

To ensure the reliability of the results, stepwise regression was used. The aim was to determine the validity and reliability signs of the coefficient of independent variables, which are frequently altered due to the existence of multicollinearity. However, in this case, the results were found to be free from multicollinearity problem. Besides, the estimated results in Table 2 are free from heteroskedasticity problem and serial correlation as tested by using the Breusch-Godfrey tests. Additionally, the Ramsey test indicates the model is free from misspecification.

Table 1: Results of the Unit Root Test

Variable	Augmented Dickey Fuller		Phillips–Perron		Remark
	Level		Level		
	Drift	Drift and Trend	Drift	Drift and Trend	
EXCHGR	-6.7794***	-6.0882***	-8.0782***	-7.1188***	I (0)
INTRGR	-5.1872***	-5.0713***	-5.2206***	-5.2317***	I (0)
PVIGR	-5.1772***	-5.0464***	-10.051***	-9.5714***	I (0)
PEGR	-3.0792**	-3.6133**	-3.1886**	-3.6133**	I (0)
IMPGR	-4.1457***	-4.0868**	-4.1441***	-4.0822**	I (0)

** and *** indicates rejection of null hypothesis at 5% and 1% significant level respectively
Note: GDPGR = a growth rate of GDP, EXCHGR = the percentage change in exchange rate, INTRGR = the percentage change in interest rate, PVIGR = a growth rate of gross private investment and IMPGR = a growth rate of import and I (0) indicates variable is stationary at level

Source: Author's Own Calculation

Table 2 presents the results of model 4b, showing that the exchange rate has a significant impact on percentage change of private investment, yet, there is no evidence of the impact of interest rate on percentage change of private investment. The results further reveal that depreciation of Tanzania shillings is correlated to the increase in private investment. The findings of the exchange rate and private investment support prior studies that the exchange rate volatility is a significant issue of concern to private investment in developing economies

like Tanzania (see Servén, 2003). In addition, the findings are in line with the ones by Soleymani and Akbari (2011) that depreciation of the currency causes domestic goods to become cheaper than imported goods; hence, the demand of domestic goods increases domestically. Due to these trends, firms respond by increasing investment on capital and labour. However, uncertainty in the exchange rate market may have an adverse effect on production costs to private investors and reduce the level of investment in the economy. Hence, appropriate policies should be implemented to ensure exchange rate stability in the economy. The price strategy monetary policy could not be a feasible approach, as the results of this study suggest that the interest rate has no influence on private investment. These findings are still puzzling as by using the Mundell-Fleming model, we expected to find some influence of both interest and exchange rates to private investment.

The results in Table 2 also indicate that the percentage change in imports had a significant positive impact on the percentage increase in private investment. This highlights that much private investment goes in hand with pressure on depreciation of Tanzanian shillings. Interestingly, it is acknowledged that depreciation of local currency makes imports more expensive; therefore, in this case, the exchange rate changes in Tanzania might be the contributing factor for the high cost of private investment. Mndeme (2015) indicated that much of Tanzanian imports are for production support, that is capital and intermediate goods seem to take more than 70% of the total imports. For a meaningful analysis, future studies should explore the share of private investment in the import of capital and intermediate goods. This will be among the enabling factors in predicting the prospect of private investment as far as the import is concerned.

The study introduced lagged values of the dependent variable (private investment) on the right-hand side. The introduction of both lag one and two of private investment improved the results. Consequently, the results improved significantly by increasing the value of R-square and removal of the serial correlation problem. This is in line with Arellano and Bond (1991) who stated that the inclusion of the lagged value of the dependent variable in the regression is one of the options in removing series correlation. However, the results indicate that only lag two of private investment was found to be significant, but with a

negative effect on the current investment. This shows that it takes two years to recognise the impact of private investments on private investment itself. Nevertheless, contrary to the expectation, the impact of lag two private investments is found to have a negative impact on current investment. Hence, the negative coefficients of both lag one and two of private investment indicate that no adjustment of private investment disequilibrium towards equilibrium point. This raises a concern regarding the prospect of private investment in Tanzania. This study suggests that future study should examine the impact of foreign private investment on gross private investment in Tanzania. This implies that the share of foreign private investment on gross investment in Tanzania is significant.

Table 2: Results of Autoregression Model Using GMM Estimation

Dependent Variable: Private Investment	
Variables	**t-Statistics**
PVIGR(-1)	-0.8035
PVIGR(-2)	-2.0289**
EXCHGR	-1.7392
INTRGR	-0.7905
IMPGR	3.1586***
PEGR(-1)	-1.0717
C	3.3138***
R-squared	0.59**
Diagnostic Test: Breusch-Godfrey Serial Correlation LM Test: F = 0.0038; Prob. F(2,12) = 0.99 Heteroskedasticity Test: Breusch-Pagan-Godfrey: F = 0.844, Prob. F(6,14) = 0.56 Ramsey Reset Test: F = 0.929 Prob. F(1, 13) = 0.35	
** and *** indicate rejection of null hypothesis at 5% and 1% significant levels respectively	

Source: Author's Own Calculation

Conclusion

This study investigated the sensitivity of Tanzanian private investment, to interest and exchange rates. The study used a sample period of 25 years and GMM method of estimation. The findings indicate that the exchange rate has a significant impact on percentage change of private investment, yet, there is no evidence of the impact of interest rate on percentage change of private

investment. The study reveals that depreciation of Tanzania shillings is correlated to the increase in private investment; this finding confirms both hypotheses 1 and 2. However, the data and model failed to find evidence of the impact of interest rate on percentage change of private investment, leading to the rejection of hypotheses 3 and 4. Hence, the findings provide inputs to the ongoing reforms in strengthening the private sector's role in promoting economic growth. Among the highlighted focus areas of these reforms in the Tanzania Development Vision 2025 include investment policy, investment promotion and facilitation, infrastructure development as well as agriculture (Tume ya Mipango, 2019). These targeted goals need a support from the financial sector. The study emphasises the need to utilise the financial sector in helping the private sector to grow.

Furthermore, the results of this study suggest that setting monetary policy by targeting the desired interest rate (price based monetary policy) may be challenging. The main attribute is that interest rates may have little influence towards investment activities, particularly from the private sector in Tanzania. This can be justified considering that 64% of Tanzania financial needs are financed through soft loans from relatives and friends (FinScope Tanzania, 2017; BoT, 2014). Perhaps, the central bank should develop a robust method of ensuring currency stability and controlling inflation. However, this study could not establish the data separating banks' credits offered for consumption and those which were offered for investment. Hence, future studies may focus on examining the impact of interest rate on banks' credits offered for investment; the findings of which are expected to be of significance in the suggested BoT's setting of monetary policy (interest based monetary policy).

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