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Interest Rates and Growth of Private Domestic Investment in Kenya; Vector Autoregressive Econometric Approach

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Abstract

This study sought to determine the relationship between short term interest rate, long term interest rate, and private domestic investment in Kenya using time series quarterly data spanning 1997 to 2018. Vector autoregressive model was used to estimate the relationship. The findings show that the central bank rate and lending rate significantly impact private domestic investment. The results emphasize the role of interest rate policy and monetary policy in driving domestic private investment in Kenya. The findings of this study will be of benefit to policy makers through provision of data-based evidence that will be used as a guide while making appropriate policies to encourage growth of private domestic investment in the country leading to economic growth.

Keywords

VAR, private domestic investment, central bank rate, and the lending rate

1. Introduction

The economic recovery and prosperity plan for Kenya is outlined in Vision 2030. Among other competing objectives, the vision seeks to transform Kenya into an industrialized, middle-income country providing a high quality of life to all its citizens in a clean and secure environment. The Vision is anchored on three key pillars: economic; social; and political governance. The economic pillar aims to achieve an average economic growth rate of 10 percent per annum and sustaining the same till 2030 (GOK, 2012). However, the realized annual economic growth rates are far below 10%. Economic growth rates have stagnated at 5.5% as depicted by Figure 1. Notably, economic recovery characterized

the period 2002 to 2018 with an increase in private investment to 22.4% from 2013 to 2014.

However, economic recovery was interrupted by the 2007/2008 global financial crisis and accentuated by 2007 political instability. The interruption also slumped private domestic investment from 20.5% to 19.5%. Economic growth trend took a nosedive in 2019, and a similar trend is assumed by private domestic investment which hits a low growth percentage point of 12.1% in 2018 growth in the previous year. According to endogenous growth models, private investments is the engine for economic growth and development (salai, 1997; Romer, 1990). From a similar theoretical perspective, the 10% growth envisioned in vision 2010 is anchored on the increase in private and public investment. Specifically, private investment was expected to rise from 15.6% of GDP in 2006/07 to 22.9% in 2012/13, and to over 24% of GDP during the period 2020/21 to 2030 (KIPPRA, 2017). The projected growth rate is minimal at 2.3 in 2020, due to COVID-19 shock which has crippled economic performance in almost all the sectors. This comes in the wake of a diminishing growth impetus as exemplified by 5.4% in the 2019 growth rate from 6.4% (KIPPRA, 2020).
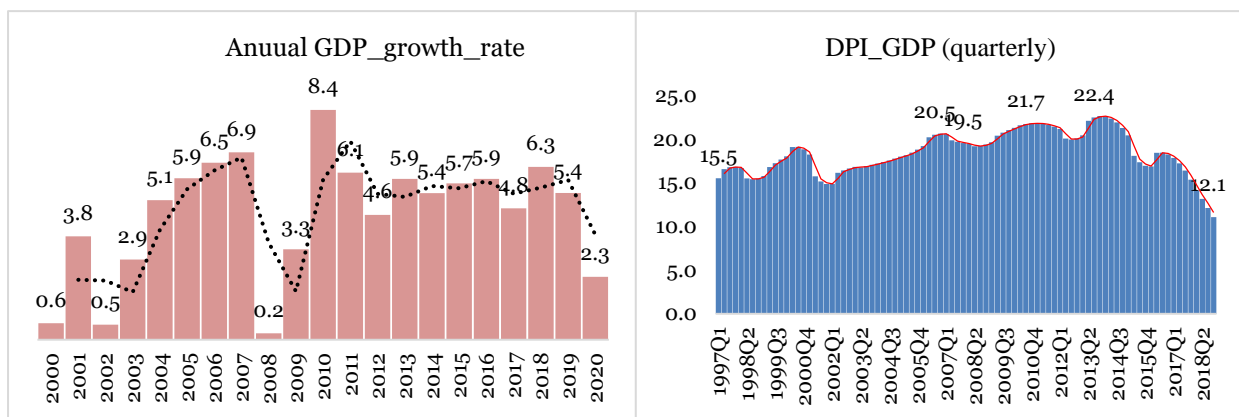
Figure 1. Economic Growth and Private Domestic Investment Trend

Source: World Development Indicators.

Empirical research work also underscores the role of private investment in driving economic growth and development. Investment is one of the very important macroeconomic variables since the capacity of an economy depends not only on labor but also on the capacity available to produce goods and services (Nghifenwa, 2013). This is in line with Bosco and Emerence (2016) argument that the rate of growth of an economy is proportional to the rate of investment. With increasing burdens on public finances, a higher investment ratio would need to come almost totally from the private investment (Mohan & Kapur, 2015).

The private sector plays a major role in the overall macro-economic development of any country, in the current development strategy private investment is acknowledged as a major source of promoting income and employment through enlarged production and productivity (Mbaye, 2014). According to Michael and Aikaeli (2014) enhancing domestic investment indicates more domestic capital formation

in the economy, which is quite healthy to economic performance since it moderates productive resources/ capital leakages. Governments of developing countries, Kenya inclusive are now considering the potential of private sector involvement in their economies and more in terms of private investment, despite these efforts private investment has remained low in most developing countries (Bosco & Emerence, 2016).

1.1 Economic Growth and Private Domestic Investment; Historical Perspective

The Kenyan economy has over the years experienced low and sharp fluctuations. Kenya's economic performance has been declining rather sharply since its independence in 1963. In the period between 1963 and 1970, private investment was at its peak fueled by the government's commitment to promoting private investment. Private investment declined in the period 1971 and 1977, this was attributed to Kenya's first oil crisis of 1973 and the prolonged drought that followed in 1974. Private sector investment was later crowded out by the heavy public sector domination that later followed (the Republic of Kenya, 1965). A recent analysis by Mutuku and Kinyanjui (2018) reaffirms the crowding-out effect of private investment by fiscal expenditure.

The coffee boom of 1976/1977 is credited for the rapid increase in private sector investment of 1978. As a result of the boom, the average household income and savings went up hence contributing to growth in investable funds. Private investment would later decline as a result of a failure by the government to make adjustments after the collapse of the coffee boom. The East African Community later disintegrated which led to a lack of market for the produced commodities. The downward trend in the economic growth of the mid-1980 is blamed on the oil crisis and the government's shift from low-interest policy (Kimani, 2005; Ngugi, Were, Makau, & Mensah, 2006).

In the 1980s, the government adopted fiscal discipline that was aimed at borrowing that is more prudent. Through these measures, confidence may have been restored in the economy regarding prospects thus slightly contributing to increased investment in 1986 and 1987. Through a raft of fiscal measures, Kenya sought to shift from a government-controlled economy to a market-driven one in 1986. The sharp decline in private investment was witnessed in the period between 1988 and 1994. From a high of 14.5% in 1987, it fell to 11.6% in 1994. Several features are attributed to this decline among them the introduction of structural adjustment programs by the World Bank and the IMF in 1986. It is argued that these adjustments failed to achieve the desired results. Additionally, the government embarked on increased domestic borrowing because of previous withdrawal by donors. Kenya was also undergoing radical political changes with the first multi-party elections of 1992, which led to uncertainties in the Kenyan economy thus discouraging private investment (Republic of Kenya 2003; Ngugi et al, 2006).

Private investment in 1995 grew to 16.4 percent, this could have been as a result of success in the implementation of policies such as re-allocation of budget resources towards core functions of the government to enhance the productivity of the Kenyan public sector. Optimism towards the re-allocation may have led to the crowding out of the private investment (the Republic of Kenya, 1994).

40

However, optimism was short-lived because declining trends marked the period between 1996 and 2002 wherein 2002, private investment stood at 9.4%. The decline can be attributed to numerous factors such as 1997 general elections that resulted into tribal clashes, second physical infrastructure destruction by the heavy rains of 1998, and lastly development expenditure cut to minimize budget deficit at most 2.5 percent of GDP (Republic of Kenya, 2002, 2003; Kiptui, 2005).

An upward spiral emerged again in 2003 but did not have the robustness hoped for after the 2002 general election that brought about political and economic transformation. This is attributed to the failure to properly implement the Economic Recovery Strategy coupled with the slow pace in implementing other reforms leading to bad relations with foreign donors (Mwakalono, 2009). The period 2000-2010 was characterized by a major recovery of gross investment with a decline being witnessed in the aftermath of the global financial meltdown and post-election violence in 2007 to 2009.
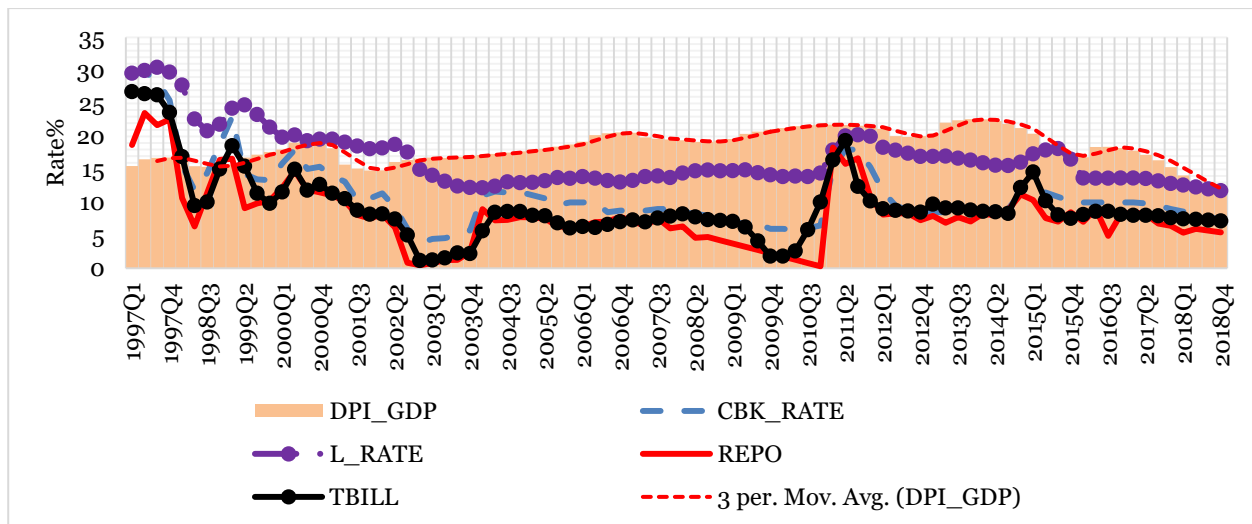
Figure 2. Interest Rates and Private Domestic Investment Trend

A review of Figure 2 shows a persistent decline in private investment from 2016-2018 signaling a further deviate from the vision 2030 expected growth rates. These further implies that achieving the vision remains a dream if the private investment trend is not reverted to its expected long-run growth path. Past research has emphasized the role of interest policy in driving private domestic investment (Khurshid, 2015; Meyer & Sanusi, 2019; Athukorala, 1998; Bader & Malawi, 2010).

Figure 2 shows a trend of both long term interest rates (commercial bank lending rate) and short term interest rates (Repo rate, Central Bank rate, and T-bill rate). The short term interest rates are closely synchronized in trend because all of them all instruments of monetary policy operation and coordination. From the beginning of the sample, 1997 to 2010, the short term interest rates are declining to suggest loose monetary policy conduct. However, the lending rates remain slightly high and less responsive especially from 2003 to 2010. This amplifies the limited monetary policy transmission mechanism as revealed by (Cheng, 2006). In the third quarters of 2002, the looser

41

monetary policy stance came into force, with nominal short-term interest rates beginning to fall below 10 percent and continuing to fall to less than 1 percent in 2004. Corresponding to these developments are accelerated growth rates for the money supply in the economy. Monetary policy tightening is witnessed in 2010 amid the rising inflation and rising interest rates. The rates fall subsequently, and much more after 2016 in response to interest rate capping policy.

For Kenya to achieve vision 2030 and create sustainable development, for growth and employment, the decline in private investments must be tamed. To induce private investment, monetary and fiscal policymakers need to know the relationship between private investment and interest rates. This study sought to determine the relationship between private domestic investment and both long term and short term interest rates using quarterly time series data spanning 1997 to 2018.

2. Literature Review

The neoclassical flexible accelerator theory is the widely accepted general theory of investment behavior and empirical tests of the model using data from several industrial countries have been quite successful (Altaleb & Alokor (2012). The basic assumption of the flexible accelerator principle is that investment is a function of the level of output and the user cost of capital. The user cost of capital is, however, dependent on the price of capital goods, the real interest rate, and the rate of depreciation of capital assets. This theory also links monetary and fiscal policy adjustment to investment (Olweny & Chiluwe, 2012). If expansiary fiscal policy (high government spending and low personal tax policy) is combined with a tax policy such as a greater investment tax credit will promote private investment. Secondly, the expansionary fiscal policy raises the level of income and expected output of the firms and will, therefore, raise the level of desired capital stock and hence stimulate investment. On the other hand, expansionary monetary policy lowers interest rate which would reduce the rental cost of capital and will increase the desired capital stock (Mundia, 2015; Hassan, 2015). The monetary policy conduct and transmission mechanism link long term and short term interest rates to investment behavior.

Empirical evidence in line with this theory is shown by Altaleb and Alokor (2012) employing the advanced econometric technique of Auto-Regressive Distributed Lag (ARDL) bounds testing approach in Nigeria. The findings showed real GDP, real interest rate, exchange rate, credit to the private sector, public investment, terms of trade, external debts, and structural factors are the key long-run determinants of private domestic investment while public investment, real GDP and terms of trade are statistically significant in the short run. Frimpong and Marbuah (2010) and Twine et al. (2015) in Uganda support similar findings. Also, Karagöz (2010) finds empirical evidence in support of the theory when determining factors of private investments for Turkey using the ARDL model. Predominantly, the studies find interest rates as key in explaining investment behavior.

Interest rate is the price borrowers' pay for the use of the money they borrow from a lender/financial institution or fee paid on borrowed assets (Crowley, 2007). According to Kithinji and Waweru (2007), interest can be thought of as "rent of money". The interest rate as a price of money reflects market

information regarding the expected change in the purchasing power of money or future inflation (Ngugi, 2001). Kidwell et al. (2016) characterize interest rates as the percent of important charged by the loan specialist for the utilization of its money. Interest rates are commonly noted on an annual premise, known as the annual rate (APR). The advantages acquired could incorporate money, shopper products, and substantial resources, for example, a vehicle or building. Interest is a rental, or renting charge to the borrower, for the utilization of a benefit. Because of a substantial resource, similar to a vehicle or building, the interest rate is also known as the rent rate (Andolfatto & Varley, 2016).

The Keynesian and Monetarists see on interest rates command the discussion on whether changes in interest rates affect private investment. One school proposes that it has a negligible effect on private investment while the other school recommends that adjustments in interest rates significantly affect investment (Becker, 2017). Haberler (2017) offers another huge perspective when she expresses that the genuine interest rate is the price at which the supply of and interest for capital are compared where capital is provided using sparing and is requested for investment. The Keynesian school trusts that interest rate is principally a monetary wonder that is dictated by the supply of and interest for money. Among this school, changes in interest rates have an insignificant effect on investment. This study seeks, therefore, to understand the relationship between the short term, long-term interest rates, and domestic private investment in Kenya using econometric model.

3. Preliminary Data Analysis

The study used quarterly time series data spanning 1997 to 2018. The time-series data were obtained from the World Bank and the Central Bank of Kenya.

Table 1. Summary Statistics

	Central bank rate(r)	Domestic private investment (dpi)	Repo rate(R)	T –bill rate (T)	Lending rate
Mean	11.18922	18.62816	8.174948	9.379182	16.92686
Median	10.00000	18.42412	7.613446	8.313334	15.57333
Maximum	29.73580	22.61956	23.54900	26.76333	30.47000
Minimum	3.829600	14.07790	0.313472	1.182450	12.20333
Std. Dev.	5.187673	2.218727	4.840424	5.128393	4.372350
Skewness	1.816373	0.048287	1.027005	1.535789	1.469588
Kurtosis	6.738664	1.952287	4.521250	6.177830	4.825194
Jarque-Bera	96.24283	3.920730	23.13826	69.18006	42.39407
Probability	0.000000	0.140807	0.000009	0.000000	0.000000
Observations	85	85	85	85	85

In the preliminary analysis, the study computes the summary statistics comprising of measures of central tendency, measures of dispersion, and a test for normality as presented in Table 1 below. All the variables are normally distributed with the central bank rate showing the highest level of volatility, followed by the T-bill rate and Repo rate with standard deviations at 5.18, 5.12, and 4.84 respectively. The average central bank rate remained at 11.1%, a fair indication that the sample period was inflationary stable. The lending rate is 16.9%, 5% above the central bank rate which implies that most of the sample period was before the lending rate capping policy in 2016 where the rate was pegged 4% above the central bank rate.

3.1 Test for Stationarity

When dealing with macroeconomic time series data it is important to determine the order of integration or non-stationarity properties of the series. If a vector y_t is integrated of order d (i.e., $y_t, \sim I\ (d))$, then the variables in y_t need to be differenced d times to induce stationarity. If the individual series has a stochastic trend it means that the variable of this series does not revert to average or long-run values after a shock strikes and its distribution does not have a constant mean and variance meaning the time series data contain a unit root. Therefore, the unit root test is necessary to avoid spurious results from the regression analysis. The study applied Augmented Dicky-Fuller (ADF) and Phillips-Perron (PP) tests for unit roots. Where the results contradict, the study relied on PP test given its superiority to other tests.

Table 2.Unit Root Test

Variable	Test	Test equation	Test statistics (level)	Test statistics (first difference)	Conclusion
Central bank rate (cbk _rate)	ADF	Intercept	-4.7250***	-6.7310***	I(0)
	PP	Intercept	-4.3084***	-6.4756***	I(0)
Domestic private Investment (DPI)	ADF	Intercept	-1.969	-3.0869**	I(1)
	PP	Intercept	-3.544***	-6.2387***	I(0)
Lending rate (L)	ADF	Intercept	-3.4675**	-5.2077***	I(0)
	PP	Intercept	-2.9481**	-4.6808****	I(0)
Repo rate (R)	ADF	Intercept	-3.588055***	-9.5282***	I(o)
	PP	Intercept	-3.1890**	-11.0611***	I(o)
T-Bill Rate (T)	ADF	Intercept	-4.8314***	-5.8711***	I(o)
	PP	Intercept	-3.9057***	-5.3578***	I(0)

The great advantage of the Philips-Perron test is that it is non-parametric, i.e., it does not require to select the level of serial correlation as in ADF and therefore is more reliable and conclusive than the ADF test (Biometrika, 1988). The results show that the Central bank rate (CBK_rate), Domestic private

Investment growth (dpi), Lending rate (L_RATE), Repo rate, and T-Bill rate are stationary at the level I(0). Since all the variables are I(0) process, meaning that they are stationary, we estimate a Vector Autoregressive (VAR) model. The coefficients of a simple VAR model can be obtained using the OLS technique.

3.2 Vector Auto-regression (VAR)

Vector Auto-regression (VAR) model is a theory-free method used for the estimation of economic relationships (Sims, 1980). According to Stock and Watson (2001), VAR captures the evolution and interdependencies between multiple time series, generalizing the univariate Autoregressive (AR) model. All the variables in VAR are treated symmetrically by including an equation explaining the evolution of each variable based on its lags and the lags of all the other variables. That is, VAR econometrics analysis involves the estimation of regression equations in which the current value of each equation is expressed as a function of lagged values of itself and each of the selected variables (Sims, 1980). The use of VAR is justified because of the possibility to simulate the response over time of any variable in a set to either on own disturbance or disturbance to any other variable in a system of equations (Stock & Watson, 2001). In VAR analysis, the only role for economic theory is to specify the variables.

For a set of n time series variables $y_t = (y_{1t}, y_{2t}, \cdots, y_{nt})'$, a VAR model of order p (VAR(p)) can be written as:

$$y_t = A_1 y_{t-1} + A_2 y_{t-2} + \ldots + A_p y_{t-p} + u_t$$

where the A_i 's are (nxn) coefficient matrices and $u_t = (u_{1t}, u_{2t}, \ldots, u_{nt})'$ is an unobservable i.i.d. zero-mean error term. Explicitly we seek to estimate the following set of equations in VAR.

$$cbk_t = \alpha_0 + \sum_{i=1}^{k} \beta_1 \, cbk_{t-i} + \sum_{i=1}^{k} \beta_2 \, dpi_{t-i} + \sum_{i=1}^{k} \beta_3 \, R_{t-i} \sum_{i=1}^{k} \beta_4 \, T_{t-i} + \sum_{i=1}^{k} \beta_5 \, L_{t-i} + \mu_1 \qquad (1)$$

$$dpi_t = \beta_0 + \sum_{i=1}^{k} \beta_1 \, dpi_{t-i} + \sum_{i=1}^{k} \beta_2 \, cbk_{t-i} + \sum_{i=1}^{k} \beta_3 \, R_{t-i} + \sum_{i=1}^{k} \beta_4 \, T_{t-i} + \sum_{i=1}^{k} \beta_5 \, L_{t-i} + \mu_2 \qquad (2)$$

$$R_t = \beta_0 + \sum_{i=1}^{k} \beta_1 \, R_{t-i} + \sum_{i=1}^{k} \beta_2 \, cbk_{t-i} + \sum_{i=1}^{k} \beta_3 \, dpi_{t-i} + \sum_{i=1}^{k} \beta_4 T_{t-i} + \sum_{i=1}^{k} \beta_5 \, L_{t-i} + \mu_2 \qquad (3)$$

$$T_t = \beta_0 + \sum_{i=1}^{k} \beta_1 \, T_{t-i} + \sum_{i=1}^{k} \beta_2 \, cbk_{t-i} + \sum_{i=1}^{k} \beta_3 \, dpi_{t-i} + \sum_{i=1}^{k} \beta_4 T_{t-i} + \sum_{i=1}^{k} \beta_5 \, L_{t-i} + \mu_2 \qquad (4)$$

$$L_t = \beta_0 + \sum_{i=1}^{k} \beta_5 \, L_{t-i} + \sum_{i=1}^{k} \beta_1 \, T_{t-i} + \sum_{i=1}^{k} \beta_2 \, cbk_{t-i} + \sum_{i=1}^{k} \beta_3 \, dpi_{t-i} + \sum_{i=1}^{k} T_{t-i} + \mu_2 \qquad (5)$$

Where i = 1…k are the number of lags

There are several steps to be met before a VAR model is estimated, Cyrus, (2014). First, we need to establish if the optimal lag length for the VAR model. Second, the VAR system needs to be stable. Lastly, the error terms of the VAR system must be homoscedastic and non-serially correlated.

3.2.1 Optimal Lag Length Determination

The optimal lag length was done by first formulating an unrestricted VAR model and then used it to determine the optimal lag length for the model. The table below highlights the results of the optimal lag length using the Final Prediction Error (FPE) criterion, Akaike's Information Criterion (AIC), Schwarz's Information Criterion (SC) and Hannan-Quinn Information Criterion (HQIC). All the criteria indicate that the optimal lag length should be 2.

45

Table 3. Optimal Lag Length Selection

VAR Lag Order Selection Criteria						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-695.4991	NA	372.4414	17.27158	17.38983	17.31902
1	-520.3502	328.6746	7.323582	13.34198	13.93320	13.57919
2	-475.9897	78.86304*	3.646975*	12.64172*	13.70592*	13.06869*
3	-460.6913	25.68613	3.738689	12.65905	14.19622	13.27578
4	-450.7232	15.75216	4.400845	12.80798	14.81813	13.61448

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

3.2.2 VAR Stability

To determine the stability of the system, and Autoregressive (AR) unit root test was conducted to test for the stability of the model. According to the autoregressive unit root test, the inverse roots of the AR characteristics polynomial of the model, take place within the unit circle. Accordingly, if all AR inverse roots are within the unit circle, the system is either stable or steady; if at least one of them is on or outside the unit circle, the system cannot be stable (Koyunce, 2014). For the AR roots graph, an estimated model is stable if all roots have modules less than one and lie inside the unit circle (Mutuku & Omwenga 2018). The result AR unit root test presented in Figure 3 below showed that all the inverse roots are within the unit circle, implying that the VAR model meets stability conditions. The tests done for suitability and stability and stability of the model, reveal that impulse response and variance decomposition will be consistent.
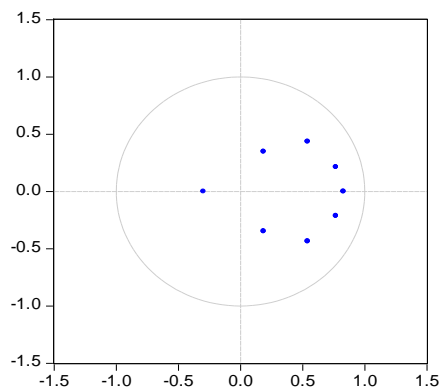
Figure 3. Inverse Roots of AR Characteristic Polynomial

3.2.3 Heteroscedasticity and Serial Correlation Tests

To investigate the appropriateness of the estimated VAR model, Heteroscedasticity and serial correlation tests were performed. For the Breusch-Pagan Godfrey heteroscedasticity test, the null hypothesis was no heteroscedasticity (homoscedasticity). For Breasch-Godfrey serial correlation LM tests, the null hypothesis was no serial correlation. The results of these tests are highlighted in Table 4 below. The findings suggest that there is neither serial correlation nor the heteroscedastic problem.

Table 4. Heteroscedasticity and Serial Correlation Tests

Test	Test Statistics	Probability	Conclusion
Breusch-Pagan Godfrey heteroskedasticity test	608.4000	0.0000	No heteroscedasticity
Breasch-Godfrey serial correlation LM tests	12.2759	0.7248	No serial autocorrelation

4. VAR Estimation

The standard practice in VAR analysis is to report results from impulse responses and forecast error variance decomposition (see Stock & Watson, 2001; Cyrus, 2014).
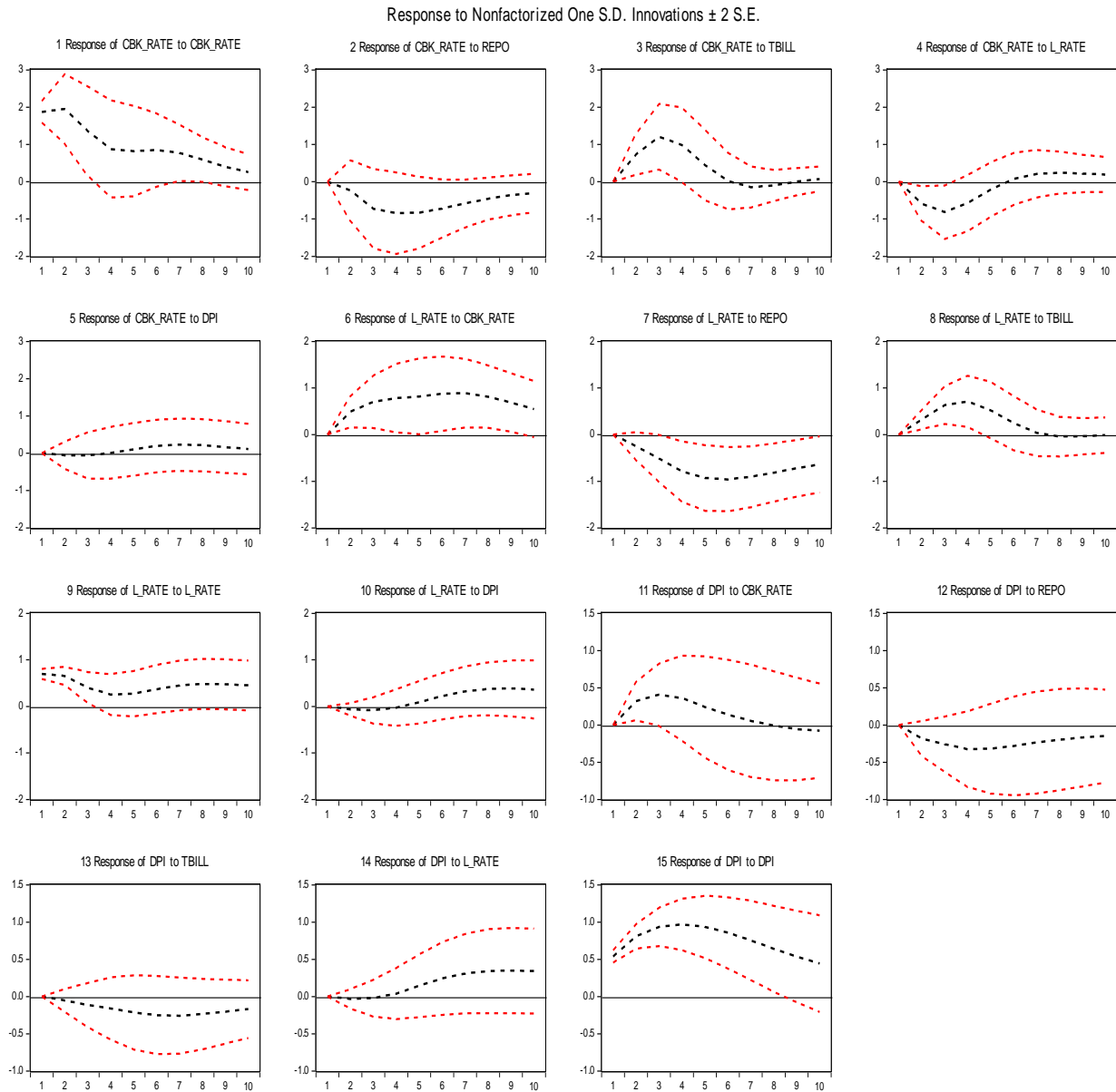
4.1 Impulse Response Function

Impulse response traces out the response of current and future values of each of the variables to a one-unit increase in the current value of one of the VAR errors, assuming that this returns to zero in the subsequent period and that all other errors are equal to zero (Stock & Watson, 2001). Impulse response functions show the effect of standard deviation shock, which may occur on each variable, on the other variables in the 95% confidence intervals (Koyuncu, 2014).

Response function charts are depicted in a panel of figures under Figure 4 below. Panel 1 to 4 shows the response of the central bank rate to one standard deviation shock in the rest of the variables. The dynamic response is traced to 10 quarters. Figure 4 shows that a shock in the central bank rate may significantly last for 4 quarters before the impact decays. A shock in the repo rate has no significant effect on the central bank rate. However, a shock in the t-bill rate tends to increase the central bank rate for 4 quarters. This is explained by monetary policy operation mechanism since an increased central bank rate meant to reduce financial market liquidity may be accompanied by an increased t-bill rate to mop up the market of excess liquidity. Such a policy instrument combination is essential in a price unstable environment.

A shock in lending rate results in a decrease in central bank rate as the monetary policy stance is loosened, creating access to cheaper credit by commercial banks hence easing the pressure on commercial lending rate. In Figure 6, an increase in central bank rate leads to a significant increase in the lending rate which is explained by the positive effect of tight monetary policy on commercial bank lending rate. The lending rate seems to decline and increase with shocks in repo rate and t-bill rate respectively which is closely explained by commercial bank activity in the open market operations

47

conducted by the Central Bank. The t-bill rate is the basis of pricing of the commercial bank rate and this is also explained by the positive effect of the t-bill rate shock on the lending rate. An increase in the lending rate lowers the domestic investment rate in 3 quarters as shown in Figure 1. A similar trend is depicted in Figure 4 by a shock in the central bank rate which lowers private domestic investment.

Figure 4. Impulse Response Functions

4.2 Variance Decomposition

The forecast error variance decomposition is the percentage in forecasting a variable due to specific shock at a given horizon (Stock & Watson 2001). Variance decomposition analysis was employed as additional evidence presenting more detailed information regarding the variance relations between the domestic private investment and interest rates. Most of the variations in the domestic private investment are

48

explained by its inertia. However, the innovative power of the central bank rate and lending rate increases significantly over time. This implies that the central bank rate and the lending rate are very important in explaining the behavior of domestic private investment.

Table 5. Variance Decomposition of Domestic Private Investment

Period	CBK_RATE	DPI	REPO	BILL	L_RATE
1	1.039286	91.76064	4.004227	0.889150	2.306696
2	0.405746	95.77169	1.700760	0.356660	1.765149
3	0.212703	96.77990	1.011841	0.188025	1.807533
4	0.644352	96.14722	0.675408	0.131440	2.401585
5	1.728993	93.97555	0.510718	0.109733	3.675004
6	2.879067	91.20263	0.425407	0.100043	5.392850
7	3.819292	88.47141	0.383280	0.090388	7.235627
8	4.544757	86.04500	0.361646	0.081137	8.967457
9	5.098010	83.98436	0.348259	0.080584	10.48879
10	5.506274	82.28360	0.337126	0.092117	11.78088

4.3 Long-run Model

In this section, the study estimated a simple model to determine the static relationship between domestic private investment and interest rates.

Table 6. Long-run Model

Variable	Model 1 Coefficient	prob	Model 2 Coefficient	Prob.
CBK_RATE			-0.500262	0.0050
L_RATE	-0.138684	0.0114	-0.017766	0.8692
TBILL_ RATE			0.246793	0.0894
REPO RATE			0.253810	0.0647
C	20.97564	0.0000	19.11397	0.0000
@TREND			0.024376	0.0476
R-squared	0.074692		0.299662	18.62816
Adjusted R-squared	0.063543		0.255337	2.218727
S.E. of regression	2.147077		1.914625	4.204894
Sum squared resid	382.6251		289.5973	4.377316
Log likelihood	-184.5470		-172.7080	4.274247
F-statistic	6.699835		6.760540	0.169928
Prob(F-statistic)	0.011382		0.000027	

Since the lending rate is closely related to the short term interest rates, multicollinearity is expected in the OLS model. To avoid this problem, the estimation is done in two phases. In the first phase, we estimated the model with the only lending rate as the explanatory variable.

The findings show that an increase in the lending rate negatively and significantly reduces private domestic investment. Controlling for the short term interest rates in the second phase of estimation, the findings show that an increase in the central bank rate significantly reduces private domestic investment. This echoes the earlier findings in this study. The commercial lending rate is the cost of loans which could be the main source of investment financing. The lending rate is majorly determined based on the central bank rate which is the rate at which loans to commercial banks are discounted by the Central Bank as the lender of last resort. The relationship between the T-bill rate, the repo rate, and domestic private investment which is expected given that the two rates are the basis of pricing government securities in which the private sector invests in for portfolio diversification.

5. Conclusion

This study sought to model the relationship between private domestic investment and long-term and short-term interest rates. The analysis reveals that the commercial bank lending rate and the central bank rate are the main drives of private domestic investment. This is consistently evident in impulse response functions, variance decomposition, and the OLS model estimated in this study. The results underscore the essence of monetary and interest rate policy in driving domestic private investment, a critical aspect for Kenya in attaining the vision 2030.

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