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Caspah Lidiema

Abstract

The aim of this study was to examine the effectiveness of monetary and fiscal policies with a view to establishing the existence of fiscal dominance in Kenya. The study employed monthly data for the period Jan 2010 - Dec 2022. Using Structural Vector Autoregressive (SVAR) Model, the study captured price dynamics through the three channels of foreign exchange, inflation and lending rates. All data was obtained from the Central Bank of Kenya online repositories. The empirical assessment of this paper leads to three broad insightful conclusions. First, from policy front, monetary policy is not fully effective in controlling and stabilizing prices especially inflation; two, expansionary fiscal policy is not only inflationary but leads to higher interests' rates as well and three: there exists traces of fiscal dominance even though it does not appear to very high form of fiscal dominance (which this study calls the slow intrusion of fiscal policy into the monetary policy space). The study therefore concludes that while fiscal dominance may not be very pronounced, there is need to review the interplay between monetary and fiscal policies to fully gain from the interdependence of the two policies by stabilizing prices and enhancing growth as expected and avoid macro-economic instability that comes with fiscal dominance. The paper recommends reducing government borrowing especially domestic borrowing, cutting unnecessary spending, directing spending towards development projects like infrastructure or social-economic projects and sectors that support or influence growth; establish the necessity of currency pegging to avoid unpleasant multiplier effect of fiscal dominance, review the emergence and effects of dollarization in Kenya and lastly review of fiscal policy and establish if there is a need for a Fiscal Policy Committee (FPC).

Key words: *Monetary Policy, Fiscal Policy, Fiscal dominance, inflation, interest rates, interest rates, dollarization, SVAR.*

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1.0 Introduction

Periods of fiscal and monetary dominance have been a topic of discussion for a long time. However, the recent macroeconomic measures of stabilizing the economy after the covid-19 pandemic have elicited the debate as to whether there is a return of fiscal dominance which can pose a threat to central banks independence (Patella et al., 2022). Monetary dominance is a situation in which price stability takes precedence over fiscal stability while fiscal dominance refers to a situation where fiscal stability has priority over price stability. Many economists have argued that fiscal dominance is a recipe for macro-economic instability, high inflation, high debts and high deficits (Hooley et al. 2021). In times of fiscal dominance controlling inflation becomes very hard since the control measure of raising interest rates would be counterproductive as the government would be unable to repay its debts. On the other hand, monetary dominance regime reduces the probability of having any room for fiscal adjustment and hence increases the probability of inflation (Jeanne,2012).

Central Banks have always played an independent role in stabilizing inflation through setting interest rates without interference from the government. This act has been described by many economists as monetary dominance as the central bank worked in isolation to control and stabilize the economy. Global economies always employ fiscal and monetary policy as tools for achieving macroeconomic objectives which include ensuring attractive price levels and controlling foe inflation. While fiscal policies are managed by the central government through legislation with the main view of enhancing output, monetary policies are managed by central banks with the key aim of controlling inflation through control the money supply and interest rates. However, the overarching goal of both monetary and fiscal policy is normally the creation of an economic environment where growth is stable and positive, and inflation is stable and low. High volatility of inflation over time raises price level uncertainty and instability (Rother,2004, Munir & Riaz,2020).

Debrun et al. 2021, asserts that expansionary fiscal policy especially increased government spending could lead to increased aggregate demand and hence increased inflation. Similarly, expansionary monetary policy like reduced interest rates or increased money supply could stimulate lending and investment and hence increased inflation. A potential problem of expansionary fiscal policy is that it leads to an increase in the size of a government's budget deficit and therefore, quite often than not increased government spending is usually financed through increased government borrowing and hence induces debt multiplier effect (Stupak, 2019, Jacobson, Leeper and Preston, 2019). However, this borrowing affects the economy through crowding out since most these government always borrow from the private sector, and this reduces private sector investment.

Ordinarily to keep inflation low, you would expect governments to reduce government spending and increase taxes in order to reduce money going into the economy. However, this move would be unpopular and might not stimulate the economy, therefore, the way government controls inflation is through the central banks by monetary policy with a view price stabilization. According to Keynesian models, an active monetary policy ensures macro-economic stability through controlling inflation (Hirose et al. 2020). However, inflation volatility has been soaring over the years and there have been challenges in stabilization due to high uncertainties surrounding economic and inflation outlook (Visco,2022).

While the two policies are meant to operate independently, the implementation of one always affects the performance of the other and quite often than not there arises tension between the government arms that implement these two polices. However, there has been instances in which a trade-off has been experienced between the two policies. For example, it is believed that during recession fiscal policies tend to be more attractive than monetary policy and vice versa. Patella et. al (2022) posits that monetary dominant regime is one in which we have an active monetary-passive fiscal policy combination where the central bank controls inflation and the fiscal authority passively accommodates to stabilize debt.

In 1992, there was considerable money supply growth to finance the first multi-party elections with Broad money (M2) growing by about 1500 basis points from from 21% percent in the 12-month period ended December 1991 to 36 percent in March 1993 (IMF, 1995). By 1993, market liquidity had grown considerably, the KES slumped, and dollarization heightened. Later that year, a contractionary monetary policy was implemented in an attempt to mop up excess liquidity, to stabilize the KES, and to address dollarization. By late 1993 and early 1994, the contractionary policy saw a tremendous increment in interest rates with the Treasury bill rate at some point rising beyond 55% (Ndung'u,1999).

While there have been successes of monetary policy in Kenya since the 1990's and the introduction of the Central Bank Rate (CBR) and operational challenges of anchoring the overnight interbank rate to the policy rate with the overnight interbank rate experiencing Large and persistent deviations from the CBR hence, there have been notable target misses even after the introduction of inflation targeting. This included a disconnected CBR from the money market rates

thereby undermining the credibility of the inflation target (IMF, 2015). However, during the 2020 Covid-19 pandemic demonstrated that monetary policy does not always control inflation on its own and fiscal policy interplay is needed stabilize inflation (IMF 2023, El-Khishin & Kassab,2021). This is because increasing public debt has led to increasing the possibility of fiscal dominance in which public deficits do not respond to monetary policy.

Just before the 2022 elections and especially during the Covid-19 period, the Kenyan government had introduced subsidies with highly moderated inflation, but public debt rose to64% of the GDP but fiscal deficit narrowed to 6.3% of GDP due you increased revenue collection (AFDB, 2023). However, after the 2022 elections , When Kenya's current administration took office, price subsidies were removed causing an increment in consumer prices (in ways that the typical monetary policy tool, interest rates, was not able to immediately control), new/additional taxes were imposed (fiscal policy), and public-sector borrowing increased (fiscal policy) at a time when some previous debt (such as a tranche of the Eurobond 2018) were maturing, causing a drastic fall in the value of the KES. According to Central Bank of Kenya reports, inflation has moved from 5.41% in December 2020 to 7.95 in December 2022 and about 8.68 in July 2023. Public debt on the other hand has increased to about 70% of the GDP (AFDB,2023).

While the main objective of the Central Bank of Kenya is to achieve and maintain price stability through formulating monetary policy and ensuring that inflationary pressures are reduced, the recent years inflation targets are having been largely above 7.5% against the preferred range of 2.5% to 7.5% set by CBK. This rate has only dropped in July 2023 to 7.3%, for instance, since May 2022. This high inflation could be attributed to high food prices due to increased petroleum products hence leading to a multiplier effect in electricity prices, production and distribution costs.

Despite the efforts by the Central Bank of Kenya to contain inflation, the removal of subsidies by the government, increased public debt and the fiscal consolation path initiated by the International Monetary Fund could have resulted in increased inflationary pressure. In the recent years, the government of Kenya, has heightened efforts in revenue collection, and increased taxes. In examining the effectiveness of monetary policy in Kenya, Were, et.al (2014) in their study found out that monetary policy was effective in controlling inflation in Kenya. However, Nathan & Jagongo (2017) found that Monetary policy tools are mixed in its effectiveness of controlling inflation. The authors found that 91-day treasury bill is an effective price control tool as opposed to the Money supply. In addition, Misati and Nyamongo (2012) also found no significant effect of monetary policy on asset prices.

In consideration that Kenya is currently on a weakly sustainable fiscal path where the government revenue does not fully finance government eexpenditure, concerns have been triggered about issues of public debt (Chemnyongoi,& Kiriga, 2020), there is need to establish if fiscal policy is affecting monetary policy effectiveness in controlling prices. These recent studies on effectiveness of monetary policy on price dynamics in Kenya have been given mixed results with

most of them only concentrating on the effectiveness of Monetary policy from the inflation channel (Saito and Hooley 2021).

Kenya pursues an inflation targeting (IT) regime just like many other developing economies due to its proven resilience (Altunbaş & Thornton 2022), there has been developing evidence that IT regimes are no better than countries pursuing other non-inflation policies (Thornton ,2016). In fact, Thornton (2016) concludes that the less technically demanding monetary regime of currency pegging remains an attractive regime option for policymakers in developing countries. However, Davis, Fujiwara & Wang (2018) posit that when central banks of relatively closed (highly open) become less credible in controlling for prices then they can only adopt a inflation target pegged on exchange rate but this will depend on trade openness.

In addition, Aizenman, Jinjarak and Ahmed (2019) assert that most emerging economies under non-inflation-targeting regimes are composed mostly of exchange-rate targeters. These economies are thought to be always in fear of floating exchange rates since exchange rate depreciation would lead to high costs of servicing their external debts and therefore fiscal authority end us using the central banks to target real exchange rate stabilizing over inflation and this would in itself be a recipe for fiscal dominance. In fact, Strong & Yayi (2021) and Taiebnia et. al, S. H (2020) argued that fiscal dominance in Africa takes many forms that range from direct financing of government debt by central banks and commercial banks, to interfering with monetary policy by putting pressure on the central banks to keep interest rates low or to intervene in the foreign exchange markets to limit currency depreciation and lower debt servicing costs. However, from literature less attention and discussion have been given to the effect of these polices on exchange rate channel (Aizenman et al. 2019).

Another concern that has been raised revolves around the aspect of dollarization both in terms of transaction dollarization (also known as currency substitution-which is the use of foreign currency for transaction purposes) and financial dollarization (also referred to as asset substitution) which consist of residents' holdings of financial assets or liabilities in foreign currency (Kessy, 2011). The greater the dollarization of the economy, the less the scope for an independent monetary policy. Dollarization or the use of foreign currencies might indicate a lack of confidence in the stability of the local currency while increasing inflation at the same time (Park & Son, 2022).

Given the recent fiscal stimulus to the economy and the subsequent reversal thereof, uncontrolled government spending, the rising public borrowing and sentiments about dollarization of the Kenyan Economy, many concerns and questions have been raised if the central government is undermining Central Bank of Kenya in influencing monetary policy to accommodate cost of debt servicing or fiscal sustainability at the expense stabilizing prices rates through market activity. These concerns rotate around high inflation and foreign exchange fluctuations. In consideration of the fact that, the debate surrounding the role of fiscal policy in the price determination process remains inconclusive and economy specific (Mangani, 2021), there is need to further review existing literature and conduct test especially in Africa on interdependence between monetary and fiscal policy with a view of confirming

or allaying fears of fiscal dominance. This paper, therefore, will be centered on fiscal and monetary policy interconnection and its role on pricing dynamics particularly inflation, Lending rates and exchange rate.

1.1 Research Objectives

- To Determine the effect of Monetary Policy on Inflation, Lending rates and Exchange rate
- To Examine the effect of Fiscal Policy on Inflation, Lending rates and Exchange rate
- To Establish if fiscal dominance exists in Kenya through pricing.

1.2 Significance of the Study

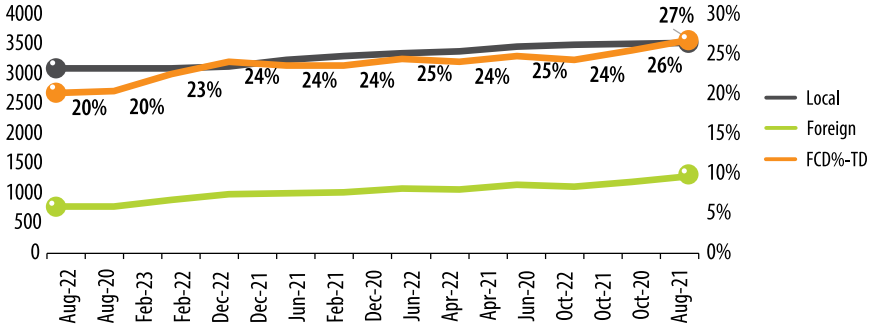
All the objectives this study will be geared towards contributing to the existing literature and also informing and enlighten and market players and policy makers on the way forward with regards to market structure and policy formulation to support growth while controlling for pricing dynamics. To begin with, the study shall address the debate around fiscal dominance in Kenya if it exists or not. In addition, the study will help readers and other researchers to understand the interaction between the two policies. To the policy makers, the study will address the effectiveness of monetary policy stabilizing pricing volatility and how fiscal policy interplay affects transmission of monetary policy and vice-versa. Furthermore, Bankers will benefit from the study from the understanding of how policy implementation will affect pricing of loans which in bottom line affects their performance of loans and profitability. Finally, the study shall enlighten further on how other macro-economic factors like exchange rate and international oil prices and affecting financial pricing in Kenya. This will assist in foreign exchange targeting policy setting and financial interplay between foreign exchange, and foreign currency credit products pricing. The remainder of the paper is organized in the following manner. Section 2-part reviews previous literature while Methodology and data are described in section 3. Section 4 will review the analysis and results of the study while conclusions and policy recommendations of the study will be in section 5.

1.3 Stylized Facts

While monetary policy decision in Kenya is undertaken by the Central Bank of Kenya through the Monetary Policy Committee (MPC), Fiscal Policy is undertaken through the National Treasury but there is no specific committee that sets limits or targets for spending, fiscal deficits or public debts. In addition, Monetary policy is Monetary policy is guided by a monetary programme, which is anchored on economic growth and inflation targets which are also provided by the National Treasury. According to Mutuku (2015), Kenya's fiscal policy stance is mainly geared towards macroeconomic stability, sustainable growth and a conducive environment for investment and innovation.

In the late 1990s, Kenya pursued an inflation objective in the context of a managed float with a variety of instruments and reserve money functioning as the operational target. As from October 2011, CBK has taken steps to develop a more forward-looking monetary framework moving gradually towards an inflation targeting regime. The Central Bank Act stipulates that the National Treasury, in consultation with CBK, sets the inflation target at the beginning of every fiscal year.

Figure 1: Trends of deposit liabilities as proxy for dollarization in Kenya

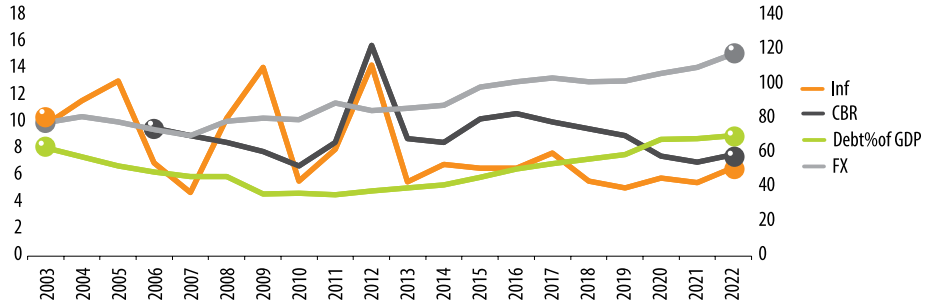


Source: Central bank of Kenya

While there is no evidence of large dollarization in Kenya, The **Figure 1** shows a large increase in the share of foreign currency deposit liabilities in the country from 20% in June 2020 to 27%. This is significant increase in just about 3 years.

However, as indicated in **Figure 2** public debt to GDP has increased from about 36.69 % in 2009 to about 70% in 2022 with inflation seemingly moving in the same direction and Central Bank rate. In addition, analysis of expenditures the years, data from Central Bank of Kenya indicates that averagely, recurrent expenditures accounts for about 71 % of the total expenditures. We also see that the Foreign Exchange rate seemingly moves in the same direction as the public debt movement.

Figure 2: Trends of Key Variables in Kenya (2003- 2022); FX is (KES-USD)



Source: Central bank of Kenya

Kenya's fiscal policy is driven mainly through taxes and government spending. While taxes have been the main driver of revenue mobilization, this has not been enough to cover government expenditures. Therefore, government spending has necessitated a multiplier effect by enhancing fiscal deficit and public debt which has occasioned many questions than answers regarding its sustainability. However, questions have been asked on its inflationary inducement nature of public debt especially from the domestic market. But the government of Kenya, still maintains its aim of fiscal consolidation of stabilizing debt over medium term.

2.0 Review of the Literature

2.1 Theoretical Review

This study is anchored on the Fiscal Theory of Price Level (FTPL) as propagated by Leeper (1991), Sims (1994) and Woodford (1994). However, the theory has its origins in the paper by Sargent & Wallace (1981) titled Some "Unpleasant Monetarist Arithmetic" in which they assert that since monetary authority affects the extent to which seignorage is exploited as a revenue source, monetary and fiscal policies simply have to be coordinated. But they pose a big question as to which of the two policies moves first in determining price dynamics, the monetary authority or the fiscal authority. Essentially, FTPL gives fiscal policy an upper hand or first priority in determining price level with monetary policy playing second fiddle. The theory describes the interconnection between fiscal policy and monetary policy in determination of and price dynamics especially through government debt (Bassetto,2008).

The theory in effect contradicts the monetarist point of view which believes in money supply growth as a factor of price level and inflation hence defying the quantity theory of money (QTM) in explaining the price dynamics in a given economy. The theory rests on the assessment of fiscal policy where government expenditure and government revenue (Lubik, 2022). FTPL assumes that government fiscal policy moves first and has complete control of public debt. However, other factors like the availability of lenders, interest rates and external factors like foreign exchange play a big role. The theory also assumes that Monetary policy will always accommodate fiscal policy when adjustment happens but in reality, this does not happen as the central Bank could decide to change take a different policy direction to that of the government. In fact, Farmer & Zabczyk (2019) assert that price level and interest rate are indeterminate even when both monetary and fiscal policy are active. The authors argue that a good combination of fiscal and monetary policies is required to determine prices.

2.2 Empirical review

Using a large sample of developing countries, Thornton (2016) appears to refute earlier suggestions in the literature that developing countries adopting the inflation

targeting (IT) regime experienced greater drops in inflation and GDP growth volatility than non-inflation targeting developing countries. Indeed, the study finds that (i) Inflation performance in Inflation Targeting economies is no better than the average for countries with alternative monetary regimes, (ii) Inflation Targeting does not reduce GDP growth volatility compared to other monetary policy regimes. And (iii) there is no reason to favor Inflation Targeting over a hard currency peg or a narrow band crawling peg in developing countries. Thornton (2016) concludes that the less technically demanding monetary regime of currency pegging remains an attractive regime option for policymakers in developing countries.

Since the Covid 19 pandemic the debate around the role of fiscal policy on controlling inflation had emerged again in view of the government's response to spur economic growth. A number of studies that have supported this school of thought include Munir & Riaz (2019) who investigated the relationship between fiscal policy and inflation using Johansen cointegration and VECM and found presence of fiscal dominance in Pakistan. The study results revealed that fiscal imbalances do not affect inflation, but government borrowing intended to support budgetary deficits has a big influence on inflation. The authors conclude that Pakistan economy is affected largely by fiscal dominance which responsible for explaining price movements.

Were et.al (2014) examined the effectiveness of monetary policy in Kenya based on structural macro-econometric models. The study used central bank rate (CBR) and the cash reserve ratio (CRR) with respect to the interest rate. Results from the study revealed that CBR has a comparatively higher impact on inflation while a change in CRR has a relatively larger impact on aggregate demand. On the contrary, Ikikii (2017) examined the Effectiveness of Monetary Policy in Kenya using quarterly data from 2000(Q1) to 2014 (Q1). The author employed Impulse Responses and Variance Decomposition from VAR model and the results revealed that real money demand and reserves have short run, but no long run effects on inflation.

Using Granger causality and VAR approaches, Nyakerario et.al (2012) examined the importance of the relationship between monetary policy variables and inflation. Results from the study revealed a dominant role of fiscal policy on both prices and output. Mathu, Osoro & Luvanda (2018) empirically analyzed effects of Fiscal Deficit on Inflation Kenya using quarterly data for the period 1996(Q1)-2017(Q2). Results from the study revealed that money supply is statistically insignificant and has unexpected negative signs. This is an indication that Money supply is not an important determinant of inflation in Kenya in the short run. The results also did not show any evidence of existence of a long run relationship between fiscal deficit and inflation, however with additional control variables fiscal deficit portrayed existence of a long run relationship.

Munir & Riaz (2020) analysed short run and long run effects of fiscal policy on inflation in Pakistan. The authors also incorporated fiscal policy volatility, discretionary fiscal policy, and volatility of discretionary fiscal policy following the IS-LM model and conducted the study using ARDL model. While using data from 1976 to 2019, the study showed that volatilities of imports, exchange rate and output

positively affected inflation volatility but fiscal policy volatility and discretionary fiscal policy, and volatility negatively affects negatively. The study also revealed that an active and timely implementation of fiscal policy has a direct reduction of inflationary pressure. The authors therefore conclude that, there is need for active and efficient role of government in maintaining stable prices.

Muriu & Maturu (2018) analyzed the relative effectiveness of monetary and fiscal policies on output stabilization in developing countries using Rwanda as a case study. The authors used quarterly data between 1996-2014 employing recursive VAR model with 12 variables (including 5 endogenous and 7exogenous variables). Results obtained using impulse responses and variance decomposition provide revealed that monetary policy is more effective than fiscal policy in explaining changes in nominal output in Rwanda. In Ghana on the other hand, Duodu, Baidoo, Yusif, & Frimpong (2022) analyzed effects of money supply and budget deficits on inflation and found that inflation responds more positively to budget deficit shocks but responded negatively to money supply (M2) shocks.

Jesus, Besarria & Maia (2020) and examined the macroeconomic effects of monetary policy shocks under fiscal restrictions of government expenditure in Brazil using a DSGE model. The researcher's variable of interest included real GDP, nominal interest rate, and household consumption with quarterly data set from 2003 Q1 to 2018 Q4. The results indicated that the restrictive fiscal rule provide more stability to public debt while monetary policy shock reduced household consumption.

Bucacos (2022) while analysing the interdependence of fiscal and monetary policies found out that for the inflation uruguay is not not exclusively monetary policy affair but elements of fiscal policy like fiscal debts also induce inflation hence pointing to the possibility of fiscal dominance. However, the level of dominance was limited to fiscal deficits affecting consumer prices positively to about 6 percent only. While applying Markov regime-switching model to estimate monetary and fiscal policy rules in India, Arora (2018) asserts that for the period under study (1951-2018), India largely had a fiscal dominated regime with a few periods of monetary restraint. The author further argues that while Monetary policy in India achieved independence post-1990s, it had largely been accommodating fiscal policy. Therefore, it meant that whenever monetary policy was active, fiscal policy undermined monetary policy's effectiveness by not accommodating it accordingly. Interestingly Canzoneri, Cumby & Diba, (2001) pose a question if the price level determined by the needs of fiscal solvency. In this study, the results reveal that data is inconsistent with the fiscal dominance hypothesis and hence the results support a monetary dominance regime. They conclude that in the US the price level is not controlled by fiscal solvency but still follows the traditional approach of monetary policy where prices are pegged to interest rates set by the central bank.

Sanusi (2020) estimated the impact of f fiscal dominance and inflation in Nigeria and South Africa by analyzing the interdependence between fiscal and monetary policies with a view of finding out if fiscal dominance gags monetary action. The study results showed no evidence of fiscal dominance with Nigeria a interdependence of 84% between the two policies

while South Africa had interdependence rate of 67%. Equally, Sanya (2021) investigated the presence of fiscal dominance and the effectiveness of monetary policy in Sub-Saharan Africa countries between 1995 to 2018 using Panel Vector Error correction model. The author finds that there is an absence of fiscal dominance in the selected Sub-Saharan Africa countries during the period under study.

Mangani (2021) conducted a study with a view of establishing if fiscal dominance exists in Malawi. The author employed autoregressive distributed lag (ARDL) model by testing effects inflation shocks transmission from fiscal deficit and its financing, after controlling for growth in agricultural output monetary policy (growth in money supply) and other macroeconomic factors like growth in real per capita income, exchange rate, trade openness. Annual data of all variables was used from the period 1970-2016. Study results revealed that there lack fiscal dominance and concluded that external factors like volatile donor aid and foreign exchange reserves play a key role in price stability in Malawi than fiscal policy operations and therefore in order to address economic stability there is need to address tis external factors through a monetary policy.

However, some studies have called for a coordinated approach between fiscal and monetary. These studies include Sanya (2021), Eita et al. (2021) and Yasmin et al. (2021). Eita et al. (2021) who employed Autoregressive Distributed Lag Model (ARDL) and Granger causality approach to examinee the impact of fiscal deficit on inflation in Namibia using data from 2002-2017. From the analysis, results indicated that there exists a long run positive relationship between fiscal deficit and inflation. The results also indicated that there exists a unidirectional causality emanating from fiscal deficit to inflation in Namibia. In order to bring fiscal deficits within acceptable levels, the authors conclude that fiscal and monetary policies should be well coordinated.

Yasmin et al. (2021) examined the Dynamic Impact of Fiscal Policy on Inflation in Pakistan using dataset between 1976 to 2019. The authors employed ARDL model and results indicated that in an open economy government has a very important and dominant role the determination of price level. The paper concluded that while fiscal policy is key in keeping inflation in control in Pakistan, there was need for a coordinated approach between fiscal policy measures and monetary policy interventions.

In their study on Management of fiscal and monetary policies interdependence in South African economy, Sanusi, Eita & Meyer (2021) employed a Bayesian VAR model using monthly data from 2009 to 2019 on inflation rate, interest rate, money supply, tax revenue, government spending and government debt. The study results showed that shocks to money supply led the monetary policy authority to raise interest rates. The study also revealed that government spending tends to fluctuate in response to money supply shocks. Interestingly, Inflation did not respond to shock in government spending, and hence they concluded that inflation in South African could be driven from the supply side instead of the demand side. While analyzing effects of whether inflation measured by the consumer price index (CPI) is affected by exchange rate, interest rate, taxation, imports, current account, unemployment, gross domestic product (GDP), and

money supply in Kuwait, Abdullah, Al-Abduljader & Naser (2020) found out that changes in CPI are positively and significantly influenced by changes in interest rate spreads, imports of goods and services and money supply.

Mishchenko (2019) examined the interdependence between monetary and fiscal policies in Ukraine for the period 2000-2007. The objective of the study was to evaluate how coordination of the two policies would stimulate economic growth. The paper employed examined the influence of monetary aggregate M3, the inflation rate and the weighted average base interest rate on the growth rates of real GDP in Ukraine. Results revealed that money supply M3, inflation and the weighted average key interest rate negatively influenced the growth rates of real GDP, due to the close relationship between the money supply growth rates and the inflation rate, as well as the monetary restriction due to the growth of the discount rate. The study also revealed that increased government debt influenced currency stability. The study finally revealed that absence of coordination between monetary and fiscal policies in Ukraine during 2009– 2017, which led to increase of inflation and slower economic growth, therefore in order to address inflation and spur economic growth there is need to have a consistent decrease in interest rate with simultaneous improvement of central bank deposit operations while simultaneously reducing external public debt.

Chibi, Benbouziane & Chekouri (2019) examined the Interaction between Monetary and Fiscal Policy in the Algerian context using data from 1963 to 2017 and found evidence of non-Ricardian fiscal policy dominance when vector Autoregression (VAR) model was used with fiscal balances having a negative correlation to government liabilities. The results also revealed that consumer prices in Algeria were largely driven by fiscal policies when ARDL model was applied. The authors also found that fiscal policy does not respond to monetary policy shocks, but monetary policy is responsive to fiscal policy shocks which is another indication of fiscal policy dominance. When Markov–switching model was applied, the results showed that monetary and fiscal policies in Algeria have interacted in a counter-actively for the period under study with fiscal policy being active and monetary policy playing second fiddle passively. Similarly, Osei & Ogunkola (2022) employed Markov-Switching Regime Dynamic Model (MSRDM) to investigate the regime effects of fiscal deficit financing on inflation and found existence of fiscal dominance in Ghana by having stronger effect on inflation in the higher regime of fiscal deficit financing while having a low impact on inflation in the lower regime of fiscal deficit.

Park and Son (2022) investigated effects of dollarization on exchange rate and inflation across foreign exchange regimes. The authors employed fixed effects models in 28 countries for the period 1995-2016. The study results revealed that high dollarization or a high depreciation rate of the domestic currency tends to increase inflation, and those effects are found to have more significant in the dollarized economies. Other authors who studied dollarization effects include Kessy (2011) and Mohamoud (2023).

3.0 Methodology

3.1 Model Specification

Structural VAR methodology has been used by various authors on how the economy responds to different shocks. This includes monetary policy shocks where studies by Sims (1980), Bernanke (1986), Christiano, Eichenbaum, and Evans (1999) and Uhlig (2005) have been used while under fiscal policy shocks Blanchard and Perotti (2002), Mountford and Uhlig (2009), Romer and Romer (2010), Mertens and Ravn (2011) also employed SVAR in their empirical studies.

Structural VAR analysis starts off by estimating a reduced simple form VAR model of order p.

$$y_t = \mu + A_1 y_{t-1} + A_2 y_{t-2} + \cdots\cdots + A_p y_{t-p} + \epsilon_t \quad \ldots\ldots\ldots\ldots (1)$$

where y_t is a $(k*1)$ vector of variables, A is a $(k*K)$ coefficient matrix, μ denotes a $(k*1)$ vector of intercept terms and ϵ_t is a $(k*1)$ dimension vector of white noise that are serially uncorrelated but may be mutually correlated.

Equation 1 can be reduced to

$$AU_t = BV_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Using the simple reduced form **equation 2** above, we could rewrite the equation to fit our dynamic variables in the study by applying the identification strategy proposed by Blanchard and Perotti (2002), where the reduced **equation 2** from residuals can be written as linear combinations of the underlying "structural" shocks.

$$AY_t = A(L)\, Y_{t-1} + AU_t = A(L)\, Y_{t-1} + BV_t \quad \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

where $A(L)$ is an $(n*k)$ matrix polynomial of the lag operator, respectively; and Y_t is a $(n*1)$ vector of endogenous variables of interest that can be

divided into policies (Monetary and Fiscal Policies). U_t is the vector of reduced form of residuals. V_t is an $(n*1)$ structural disturbances with a 0 mean 0 and $Var(V_t)=\Psi$. (where Ψ denotes a diagonal Matrix) The elements of the diagonal matrix represent variances of structural disturbances; therefore, we assume that the structural disturbances are mutually uncorrelated.

We then express the reduced form of residuals as

$$U_t=[\, u_t^s\, u_t^f\, u_t^d\, u_t^p].$$

Where u_t^s is the government spending, u_t^f is the fiscal deficit and u_t^d is public debt and u_t^p is the price dynamics (Inflation and lending rates). The residuals are also repeated for the monetary policy shocks.

After the estimation of VAR model, impulse responses and then computed in order to evaluate the dynamic effects of structural shocks to fiscal and monetary policies. The objective of this research is to identify structural shocks and the response of inflation and lending rates to these shocks.

3.2 Data

In this study, monthly data for all variables from Jan 2010 to Dec 2022 will be employed. Inflation rate and interest rates will be used as response variables as representatives of pricing dynamics. Consumer price index (CPI), average bank lending rates and Foreign Exchange rates (USD-KES) will be used as proxies for pricing dynamics. The Central Bank Rate (CBR) and they will represent monetary policy stance while government spending, public debt will represent the fiscal policy stance. When government expenditures exceed government tax revenues in a given year, the government is running a budget deficit for that year. The budget deficit, which is the difference between government expenditures and tax revenues, is financed by government borrowing. This is the main reason for including public debt as an additional proxy for fiscal policy. The 91-day Treasury bills rate was be employed as double-edged sword. This is because the Treasury bills rates reflect two things, namely, market liquidity conditions and the extent of borrowing by the government. While the latter partly reflects the fiscal policy stance (not monetary policy), one cannot fully discount the effect of market liquidity on the Treasury bills rates. It is also reasonable to argue that the government may use Treasury bills to control money supply, in which case it would reflects monetary policy stance. Thus, whether the Treasury bills rates represent monetary policy or fiscal policy depends on their purpose, but importantly, the interest rate on those bills are not a "pure" reflection of the policy position of the government since they are market determined.

4.0 Empirical Findings and Discussion

4.1 Descriptive and Stationarity test

Considering that all variables save for Central bank rate, Lending Rates and T-bill are natural logs, we could consider the values presented as growth rates of those specific variables. Therefore, Descriptive statistics presented in **Table 1A** indicates that foreign exchange rate has been growing at a rate of about 4% on monthly basis while lending rates have been on monthly average of 14.7% while 90-day treasury bill rate has been on monthly average of 8.3% from January 2010-December 2022. On the other hand, inflation has been growing at around 4 basis points on average. Government spending and public debt have been growing at an average of 6.4% and 1.3% respectively.

Table 1A: Summary of Descriptive Statistics

	lnFX	lnCPI	LR	CBR	Tbill	Debt	lnGS
count	156	156	156	156	156	156	156
Mean	4.573	4.448	14.707	9.143	8.269	1.334	6.421
Median	4.616	4.486	13.875	8.500	8.035	1.047	6.615
Maximum	4.812	4.860	20.340	18.000	21.650	8.234	8.014
Minimum	4.328	3.981	11.750	5.750	1.630	-6.084	3.582
Std. Dev.	0.116	0.244	2.476	2.719	3.126	1.693	0.986
Skewness	-0.180	-0.244	0.686	1.790	1.459	0.101	-0.846
Kurtosis	2.051	2.054	2.308	6.508	7.951	7.415	3.240
Jarque-bera	6.698	7.372	15.354	163.289	214.711	126.971	18.993
p-value	0.035	0.025	0.000	0.000	0.000	0.005	0.000

The stationary test presented in **table 1B** shows that apart from 90-day Treasury bill all other variables are non-stationary at level. However, upon differencing, all variables become stationary or integrated of order one I (1). All tests are performed using Augmented Dickey Fuller (ADF) tests.

Table 1B: Stationarity Test Results

ADF Ttest at Level and 1st Difference				Critical Values			Decision
		Test Statistic	p-value	1%	5%	10%	
LnFX	Level	-1.0704	0.7267	-3.4731	-2.8802	-2.5768	Non-Stationary
	1st Diff	-7.8174	0.0000	-3.4731	-2.8802	-2.5768	Stationary
lnCPI	Level	-1.1024	0.7143	-3.4731	-2.8802	-2.5768	Non-Stationary
	1st Diff	-6.8860	0.0000	-3.4731	-2.8802	-2.5768	Stationary
LR	Level	-1.4252	0.5686	-3.4731	-2.8802	-2.5768	Non-Stationary
	1st Diff	-10.0804	0.0000	-3.4731	-2.8802	-2.5768	Stationary
Tbill	Level	-3.4965	0.0093	-3.4737	-2.8805	-2.5769	Stationary
	1st Diff	-6.2899	0.0000	-3.4737	-2.8805	-2.5769	Stationary
CBR	Level	-3.5196	0.0087	-3.4740	-2.8806	-2.5770	Stationary
	1st Diff	-4.4124	0.0000	-3.4740	-2.8806	-2.5770	Stationary
LnGS	Level	-1.2519	0.6507	-3.4765	-2.8817	-2.5776	Non-Stationary
	1st Diff	-4.5952	0.0000	-3.4765	-2.8817	-2.5776	Stationary
lnDebt	Level	0.9273	0.9957	-3.4765	-2.8817	-2.5776	Non-Stationary
	1st Diff	-3.4114	0.0121	-3.4765	-2.8817	-2.5776	Stationary

4.2 Johansen Cointegration Test

The Johansen test is used to test for long run relationship between several non-stationary time series data. Given that all our variables under study are non-stationary at level, Johansen test is applied to check existence of long run relationship. Johansen's test comes in two main forms, i.e., Trace tests and Maximum Eigen value tests. Table 1C in Appendix, shows the Trace and maximum eigne value test results revealing the presence of long run relationship at 5% significance level.

Table 1C: Cointegration Test Results

Sample(Adjusted): 2010M07 2022M12
Included observations: 150 after adjustments
Trend Assumptions: Linear Deterministic trend
Series: D(LNFX) D(LNCPI) D(LR) D(TBILL) D(CBR) D(LNGS) D(LNDEBT)
Lags interval (in first differences) : 1 to 4

Unrestricted Cointegration Rank Test (Trace)

"Hypothesized No of CE(s)"	Eigen Value	"Trace Statistics"	"0.05 Critical value"	Prob.**
None	0.446418	357.0602	125.6154	0.0000
AT Most 1*	0.376038	268.3584	95.7537	0.0000
AT Most 2*	0.344965	197.6085	69.8189	0.0000
AT Most 3*	0.272773	134.1484	47.8561	0.0000
AT Most 4*	0.202726	86.3709	29.7971	0.0000
AT Most 5*	0.169100	52.3874	15.4947	0.0000
AT Most 6*	0.151261	24.6006	3.8415	0.0000

Unrestricted Cointegration Rank Test (Maximum Eigen Value)

"Hypothesized No of CE(s)"	Eigen Value	"Max-Eigen Statistic"	"0.05 Critical value"	Prob.**
None	0.446418	88.7019	46.2314	0.0000
AT Most 1*	0.376038	70.7499	40.0776	0.0000
AT Most 2*	0.344965	63.4600	33.8769	0.0000
AT Most 3*	0.272773	47.7776	27.5843	0.0000
AT Most 4*	0.202726	33.9835	21.1316	0.0000
AT Most 5*	0.169100	27.7868	14.2646	0.0000
AT Most 6*	0.151261	24.6006	3.8415	0.0000

4.3 Granger Causality Tests

This study begins by analyzing granger causality tests for variables under study to establish the relationship between fiscal and monetary policies. Granger causality results are reported based on F-statistic and the p-value. The granger causality results as indicated in **Table 1D** reveal that there is a bidirectional causality between foreign exchange and Central bank rate while there a unidirectional causality between public debt running from foreign exchange. This could be an indication that debt does not have any causality on forex. We also see no causality between central bank rate, T-bill rate and inflation. Results for lending rates indicate that there is a unidirectional causality running from Central bank rate to lending rates. Similarly, we have a unidirectional causality running from CBR rate to debt. An indication that monetary policy is directed towards fiscal sustainability through debt. In addition, there exists a unidirectional causality running from government spending towards 91-day treasury bill. Considering that 91-Treasury bill provides direction of expected inflation this could be an indication of government spending causing inflation. While we did not find evidence of Government spending granger causing Lending rates at 5% significance level, there exists unidirectional causality between government spending and lending rates at 10% significance level. This result differs with the results by Uwilingiye & Gupta (2009) who found unidirectional causality between t budget deficit Granger causes interest rate.

4.4 Lag Order Selection

Due to limitations of granger causality tests, results from this method may not give a true and completer picture regarding the relationship between variables. Granger causality accounts for only direct causality and indirect causality are not completely captured. Therefore, in order to account for indirect causality between variables under study, we consider a Structural Vector Autoregressive (SVAR) Model and interpret our results using the impulse responses.

However, before carrying out the SVAR test, the study had to determine the lag order. LR test statistic, Akaike Information (AIC), Schwarz Bayesian (SC), Hannan-Quin (HQ), and Final Prediction Error (FPE) Information criteria are used to determine the lag order. Table 1E below indicate that VAR models with 1 lag (SC:1.14), 2 lags (HQ: 0.4757), and 3 lags (LR: 133.11, FPE: 1.14e-09 and AIC: -7.430). We can therefore choose between 1, 2 and 3 lags as the best lag for the SVAR model. Usually, the Schwarz Information Criterion or

Table 1E: Lag Order Selection Test Results

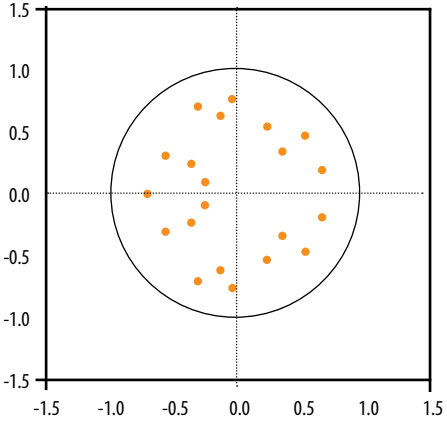
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-68.8226	N/A	6.44e-09	1.00427	1.14415	1.0611
1	54.4075	233.4027	2.41e-09	0.02109	1.140084*	0.475685*
2	132.1918	140.1148	1.69e-09	-0.03602	1.73795	0.4922
3	210.1001	133.1149*	1.14e-09*	-0.074305*	2.33418	0.5071
4	247.0052	59.6348	0.0000	-0.5828	3.47349	1.0650

Bayesian Information Criterion is relatively consistent as compared to other models, however, when the stability tests were performed, only three lags were found to be stable. Therefore, this study the study chooses lag 3 as the appropriate lag.

4.5 Stability Test

The stability test results as presented using the Inverse Roots of AR Characteristic Polynomial in **Figure 2.1** indicates that all roots have modulus less than one and lie inside the unit circle. Therefore, our SVAR model with 3 lags is stable and hence further analysis can be performed.

Figure 2.1: VAR stability test polynomial



4.6 Serial Correlation Test

Autocorrelation test was done using the multivariate LM test statistics for residual serial correlation up to 12 lags. The LM test results as shown in **Table 1F** indicate absence of autocorrelation for the model with any of the lags save at 11 and 12 lags.

Table 1F: VAR serial correlation LM Test Results

"Null Hypothesi: No Serial Correlation at lag h"

Lag	LRE*stat	df	Prob.	Rao F-stat	df	Prob.
1	53.2770	49	0.3131	1.09342	49,476.6	0.3146
2	63.0182	49	0.0860	1.30623	49,476.6	0.0868
2	45.8078	49	0.6033	0.93300	49,476.6	0.6047
4	41.4741	49	0.7688	0.84103	49,476.6	0.7698
5	37.3613	49	0.8879	0.75448	49,476.6	0.8885
6	54.5248	49	0.2725	1.12043	49,476.6	0.2739
7	38.5372	49	0.8587	0.77915	49,476.6	0.8594
8	55.8320	49	0.2336	1.14882	49,476.6	0.0235
9	51.4682	49	0.3774	1.05434	49,476.6	0.3789
10	51.8183	49	0.3645	1.06189	49,476.6	0.3660
11	86.3420	49	0.0008	1.83296	49,476.6	0.0008
12	106.8133	49	0.0000	2.3160	49,476.6	0.0000

4.7 Effect of Monetary Policy on Prices

The effect of fiscal policy variables is shown in Figure 2.2 columns 1 and 2 below through the impulse response. The results reveal that the Foreign Exchange rate is negatively affected after one standard deviation innovation is applied to the Central bank rate (CBR) in the first period before declining almost immediately in the second month. Implying that monetary policy tightening appreciate the Kenyan shilling. Graphically there was a contraction in the forex rate as it gradually declined in the negative zone for the almost 4 months before stabilizing in the sixth month when it approached zero.

This would be a pointer of the monetary policy direction towards stabilizing the Kenyan currency. Similarly, CBR innovations reduces inflation but after 3 months and remains subdued for almost 6 months before stabilizing. However, regarding lending rates the situation is rather positively affected. One standard deviation shock on CBR induces a positive effect on lending rates in the second month before moving up and down between the fourth month and the sixth month when they stabilize. On the other hand, the impulse response function from indicates that a shock to the 91-day treasury bill rate does not generate any response from inflation.

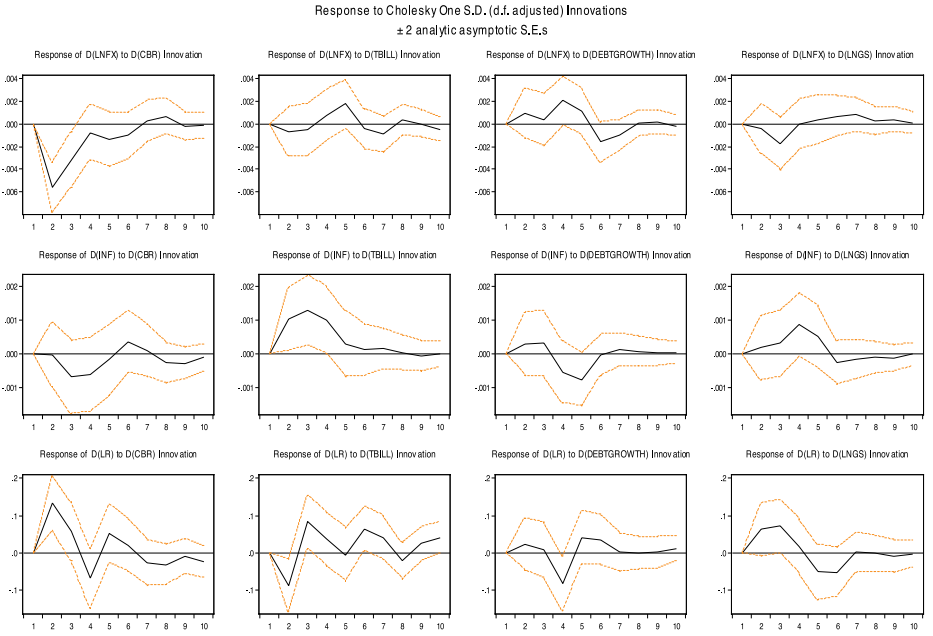
However, the response instantaneously moves upwards positively to the second month before beginning to decline smoothly but remains positive through to the sixth month where it fades out. This points to the direction of expected inflation and does not really have a direct effect on T-bill inducing inflation. This result agrees with the study by Abdullah et. al (2020) found interest rates to positively influence inflation.

4.8 Effect of Fiscal Policies on Prices

The effect of fiscal policy variables is shown in Figure 2.2 through impulse responses in columns three and four. Results reveal that one standard deviation of expansionary fiscal policy significantly increases price level for a period of about 3-4 months. The impulse response indicates that 1% shock to public debt impacts positively to foreign exchange rate, inflation and lending rate. Similar results can be seen from the lending rate channel where debt shocks induce positive effects leading to higher interest rates. This is an indication that the public debt transmits not only inflationary pressure but currency depreciation as well. This result agrees with the results of Osei & Ogunkola (2022) and Chemnyongoi & Kiriga (2020) who posit that fiscal deficits are not only inflationary in nature but could lead to higher interest rates and in the long run could also lead to crowding out.

Impulses responses from government spending indicates that 1% standard deviation shock induces inflation from the second month and remains significantly high up to six months before its fades out. This could point to the fact that increased government spending induces more money into the economy hence consumers and businesses have more money leading to more purchases and hence business end up increasing prices.

Figure 2.2: effect of Monetary and Fiscal policies to pricing dynamics.



Similarly, we see a 1% standard deviation innovation in government spending leads generates a positive response from the lending rate in the immediate period and remains positively high for a period of about 4 months before reducing drastically into the negative zone and moving up again and decaying to zero from the sixth month. These results agree with the studies of Mutuku (2015); Fakher, 2016; Debrun et al. 2021); Eita et al.,2021; Stupak ,2019; Jacobson, Leeper & Preston, 2019 and Eita, 2021 whose findings revealed that one standard deviation tightening in fiscal policy significantly reduces price levels and thus expansionary fiscal policy significantly increases prices. On the contrary we find that increased government spending leads to the Kenyan shilling appreciating significantly albeit for only three months before beginning to depreciate and stabilizing after month five. These results agree with the results of Kim (2015) and Miyamoto et.al (2019) whose studies revealed currency depreciation in response to an increased government spending. This result is expected under IS curve since the Kenya economy is debt-financed and therefore increased government spending (fiscal policy) may act on the exchange

rate through higher interest rates and expected high output. This paper therefore makes a preliminary inference that fiscal policy dominates monetary policy because interest rates are determined by government borrowing rather than the declared monetary policy stance.

4.9 Variance Decomposition Test

The forecast error variance decomposition (FEVD) of a state-space model measures the volatility or movement proportionality that occurs due to its own shocks versus the shocks of other variables in that model. For analysis this study used period 3 and 10 to represent the short and long-run periods respectively.

The variance decomposition of Foreign Exchange (lnFX) inflation rate (INF) and Lending rate (LR) for the SVAR estimation is presented in Table 1G. The test result shows that own shock constituted the most source of fluctuation in the model followed by shocks from Central bank rate (CBR) and Lending rates for the case of currency depreciation while inflation own shock constituted almost 92% in the short run followed by 91-day treasury bill rate. A clear indication that treasury bill rate can be used to give direction of expected inflation in the country. However, growth in public debt contributed a significant number of shocks towards inflation amounting to about 1.5% in the short run and almost 2% in the long run.

With regard to lending rates, the variance decomposition indicates that own shock contributes about 66% in the short run followed by foreign exchange fluctuations shocks of about 13% and CBR at 10%. The same trend occurs in the long run only that own stock reduces to 58% with foreign exchange rate shocks contributing about 15% and CBR shocks remaining the same. Interestingly we see a large contribution of almost 4% shock contribution from the fiscal space through to lending rates in the short run and 7% in the long run. These results reveal that fiscal policy shocks tend to manifest largely through inflation and Lending rates in large portions in both the short run and long run while Monetary policy is largely transmitted through the foreign exchange fluctuations.

5.0 Conclusion and Policy recommendation

This study sort to establish the presence of fiscal dominance in Kenya or lack of it. The study employed Structural Vector Autoregressive (SVAR) Model to investigate the existence of fiscal dominance on pricing dynamics in Kenya. The fiscal policy stance was proxied by public debt and government spending while monetary policy stance was proxied by Central Bank rate (CBR). The 91-day Treasury bill rate was used as both an element of fiscal and monetary policy. The empirical assessment of this paper leads to three broad insightful conclusions. First, from the analysis policy front, monetary policy is not fully effective in controlling and stabilizing prices especially inflation; two, expansionary fiscal policy is not only inflationary but leads to higher interests' rates as well and three: there exists traces of fiscal dominance even though it does not appear to very high form of high fiscal dominance.

Results from the study revealed that monetary policy shocks impacted foreign exchange (17%) more than inflation (2.5%) and Lending rates (10%) a clear indication that monetary policy is largely manifested through foreign exchange. This result would imply that the central bank's real target is exchange rate stabilizing over inflation with debt servicing costs in mind. Expansionary Fiscal policy, on the other hand shocks is clearly inflationary from both public borrowing and government spending as manifested through inflation rates and lending rates. Using all forms of analysis including granger causality and SVAR the study results indicate there exists traces of fiscal dominance even though it does not appear to very high form of high fiscal dominance. While CBK explicitly commits to a market-determined forex rate based on market activity, results from this study reveal otherwise. Although this is not primarily a monetary policy concerns but rather stems from the desire of seeking to assure fiscal sustainability and hence this would be a pointer of the monetary policy direction towards stabilizing the Kenyan currency. This in itself is a signal of some level of fiscal dominance.

Going by the results of this study, if fiscal policy becomes dominant and monetary policy plays second fiddle to fiscal authority, then the multiplier effect may not

pleasant because this could be "slow intrusion of fiscal policy into the monetary policy space". A positive interplay between monetary policy and fiscal policy has many benefits to economic growth and price stability than we can fathom. Therefore, this study's findings evoke several implications for policy.

First, there is need to re-examine government spending with a view of effectively reducing deficit by reducing unnecessary expenditures while increasing revenue collection from all available channels. By cutting spending, the economy can benefit from reduced interest rates. Direct spending towards development projects like infrastructure or social-economic projects like education and health which have a higher impact on human capital. In addition, government spending should also be directed to productive sectors that support or influence growth. Second, the government should reduce domestic borrowing through the central bank or directly from commercial banks as this not only crowds out investments but leads to increases taxes, push up interest rates because markets are nervous about governments ability to repay and most importantly could interfere with monetary policy. Third, there is need to review emergence of dollarization in Kenya both transactional and financial which could be a recipe for inflation and local currency instability.

Four, there is also the need to review the monetary regime with a view of establishing if there is necessity to a regime change towards currency pegging which remains attractive option to some policymakers in developing and emerging economies. Finally, the paper suggests review of fiscal policy and establish if there is a need for a Fiscal Policy Committee (FPC) within the National Treasury to mimic the Monetary policy Committee. The Fiscal Policy Committee can have general oversight over the current existing directorates within Treasury. Among other roles, the FPC should manage economic and fiscal policy, provide advice and guidance on government spending and public debt management with anchoring focus on fiscal sustainability. In addition, the FPC could collaborate with MPC on various interconnected issues of economic growth and inflation to avoid intrusion by either policy while maintaining targets levels for each other.

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APPENDIX

Table 1D: Granger Causality Test Results

Null Hypothesis:	Obs	F-Statistic	Prob.
D(INF) does not Granger Cause D(LNFX)	152	1.80178	0.14950
D(LNFX) does not Granger Cause D(INF)		0.23293	0.87330
D(LR) does not Granger Cause D(LNFX)	152	2.68049	0.04910
D(LNFX) does not Granger Cause D(LR)		4.93997	0.00270
D(CBR) does not Granger Cause D(LNFX)	152	9.49789	0.00001
D(LNFX) does not Granger Cause D(CBR)		13.82110	0.00000
D(TBILL) does not Granger Cause D(LNFX)	152	1.68767	0.17230
D(LNFX) does not Granger Cause D(TBILL)		10.27280	0.00000
D(LNDEBT) does not Granger Cause D(LNFX)	152	1.47697	0.22330
D(LNFX) does not Granger Cause D(LNDEBT)		3.08426	0.02930
D(LNGS) does not Granger Cause D(LNFX)	152	0.94464	0.42080
D(LNFX) does not Granger Cause D(LNGS)		1.51737	0.21250
D(LR) does not Granger Cause D(INF)	152	0.41413	0.74310
D(INF) does not Granger Cause D(LR)		1.44593	0.23190
D(CBR) does not Granger Cause D(INF)	152	0.38782	0.76190
D(INF) does not Granger Cause D(CBR)		2.37438	0.07260
D(TBILL) does not Granger Cause D(INF)	152	1.95775	0.12300
D(INF) does not Granger Cause D(TBILL)		1.55676	0.20250
D(LNDEBT) does not Granger Cause D(INF)	152	1.72635	0.16420
D(INF) does not Granger Cause D(LNDEBT)		0.14922	0.93000

Null Hypothesis:	Obs	F-Statistic	Prob.
D(LNDEBT) does not Granger Cause D(INF)	152	1.72635	0.16420
D(INF) does not Granger Cause D(LNDEBT)		0.14922	0.93000
D(LNGS) does not Granger Cause D(INF)	152	1.06683	0.36520
D(INF) does not Granger Cause D(LNGS)		13.87780	0.00000
D(CBR) does not Granger Cause D(LR)	152	10.42710	0.00000
D(LR) does not Granger Cause D(CBR)		1.26867	0.28740
D(TBILL) does not Granger Cause D(LR)	152	4.87838	0.00290
D(LR) does not Granger Cause D(TBILL)		3.53640	0.01640
D(LNDEBT) does not Granger Cause D(LR)	152	2.37373	0.07270
D(LR) does not Granger Cause D(LNDEBT)		0.35092	0.78850
D(LNGS) does not Granger Cause D(LR)	152	2.14346	0.09730
D(LR) does not Granger Cause D(LNGS)		0.04058	0.98910
D(TBILL) does not Granger Cause D(CBR)	152	1.45393	0.22970
D(CBR) does not Granger Cause D(TBILL)		2.84073	0.04000
D(LNDEBT) does not Granger Cause D(CBR)	152	0.48993	0.68980
D(CBR) does not Granger Cause D(LNDEBT)		5.63882	0.00110
D(LNGS) does not Granger Cause D(CBR)	152	1.36522	0.25580
D(CBR) does not Granger Cause D(LNGS)		0.26713	0.84900
D(LNDEBT) does not Granger Cause D(TBILL)	152	1.88625	0.13450
D(TBILL) does not Granger Cause D(LNDEBT)		0.54622	0.65150
D(LNGS) does not Granger Cause D(TBILL)	152	3.19083	0.02550
D(TBILL) does not Granger Cause D(LNGS)		0.83750	0.47540
D(LNGS) does not Granger Cause D(LNDEBT)	152	2.35531	0.07440
D(LNDEBT) does not Granger Cause D(LNGS)		2.37795	0.07230

Table 1G: Variance decomposition: Monetary policy and fiscal effects on pricing dynamics

Variance Decomposition of D(LNFX):

Period	S.E.	D(LNFX)	D(INF)	D(LR)	D(CBR)	D(TBILL)	D(DEBT)	D(LNGS)
1	0.012504	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.014415	80.98824	2.493298	2.081423	13.54122	0.39748	0.001216	0.497124
3	0.015256	72.42249	2.545559	3.692067	17.75489	1.281215	0.002963	2.300812
4	0.015733	68.2247	3.57398	5.949684	17.07473	1.329269	1.620658	2.226977
5	0.015867	67.67628	3.681618	6.103454	17.35377	1.339981	1.600205	2.244692
6	0.016031	67.14355	3.870116	6.214253	17.32973	1.483359	1.673191	2.285802
7	0.016081	67.02239	3.972126	6.192805	17.39221	1.483355	1.664624	2.272492
8	0.016099	66.93203	4.026245	6.187817	17.38002	1.514622	1.689735	2.269525
9	0.016126	66.75963	4.218568	6.206628	17.32325	1.5107	1.690574	2.290649
10	0.016135	66.70181	4.255382	6.208955	17.30374	1.521216	1.72084	2.288056

Variance Decomposition of D(INF):

Period	S.E.	D(LNFX)	D(INF)	D(LR)	D(CBR)	D(TBILL)	D(DEBT)	D(LNGS)
1	0.00533	1.00182	98.99818	0.00000	0.00000	0.00000	0.00000	0.00000
2	0.00628	1.35855	96.48416	0.00003	0.03485	1.39376	0.59461	0.13405
3	0.00650	1.38385	91.85972	0.27733	1.12945	3.69050	1.42484	0.23430
4	0.00663	1.50118	89.01266	0.29645	2.02386	4.40130	1.47004	1.29451
5	0.00669	1.97835	87.97067	0.53375	2.15463	4.33236	1.73005	1.30020
6	0.00674	2.52087	86.72390	0.92795	2.22002	4.32134	1.76792	1.51801
7	0.00676	2.84244	86.27624	1.03504	2.21029	4.29055	1.77580	1.56965
8	0.00678	2.88523	85.99447	1.09811	2.39297	4.28280	1.77184	1.57458
9	0.00679	2.88001	85.83130	1.14851	2.49298	4.30098	1.76514	1.58108
10	0.00680	2.89220	85.76011	1.19238	2.49733	4.28900	1.77976	1.58922

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