

INTERACTION OF FISCAL AND MONETARY POLICIES AND THE EFFECTS ON
SHARE PRICES AT THE NAIROBI SECURITIES EXCHANGE


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DECLARATION

This project is my original work and has not been presented for a degree in any other University or for any other award.


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DEDICATION

This work is dedicated to my wife Esther Wangari and my son Niel Wamwere .

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ABBREVIATIONS AND ACRONYMS

ASI:	All Share Index
ER:	Exchange Rate
FEVD:	Forecast Error Variance Decomposition
IFC:	International Financial Corporation
INF:	Inflation
MPC:	Marginal Propensity to Consume
NASI:	Nairobi Securities Exchange All Share Index
NSE:	Nairobi Securities Exchange
NSE20 Index:	Nairobi Securities Exchange 20-Share index
SP:	Share Prices
VAR:	Vector Auto-Regression
VAT:	Value Added Tax

OPERATIONAL DEFINITION OF TERMS

- Fiscal Policy:** The means by which a government adjusts its spending levels, debt levels, and tax rates to monitor and influence a nation's economy.
- IS-LM model:** A model showing combinations of income and interest rate that causes equilibrium in the goods and money market.
- Monetary Policy:** Refers to Central Bank influencing the level of money supply in the economy in order to control the economy.
- NASI:** It is a measure of overall indicator of market performance that incorporates all the traded shares of the day.
- NSE20:** It is the geometric mean of share prices of the Nairobi Securities Exchange's twenty top stocks.

ABSTRACT

The stock market plays a key role in the development of an economy. The market enhances savings and efficient allocation of scarce resources. The share prices have been volatile at the Nairobi Securities Exchange. This volatility hurts predictability of share prices and investors hardly know what to expect and when. The fiscal and monetary policies have been found to have a role in performance of share prices independently. However, the effect of their interaction on share prices has been ignored in earlier studies. This study seeks to evaluate the effects of the interaction of fiscal and monetary policies through interest rate, inflation rate, and exchange rate, on share prices at the Nairobi Securities Exchange. To achieve the specific objectives, the share prices were regressed on estimated values of inflation rate, exchange rate, and interest rate under Two-Stage Least Square Method. The data used in the study included quarterly time series data for money supply, current account deficit, public debt, government deficit, interest rate, exchange rate, inflation, and NSE20 from 2006 and 2014 which were collected from Central Bank of Kenya and Nairobi Securities Exchange. An interactive variable representing interaction of fiscal and monetary policies was introduced in the inflation rate, exchange rate, and interest rate equations. It was computed as a product of money supply and budget deficit. Inflation rate was estimated using money supply, government deficit, and interactive variable. Money supply, government deficit, and interactive variable had significant coefficients. Exchange rate was estimated using money supply, current account deficit, public debt, budget deficit and interactive variables as the independent variables. The coefficients for money supply, current account deficit, budget deficit, and interactive variable were statistically significant. Interest rate was estimated as a function of money supply, public debt, government deficit, and interactive variable. The coefficients of money supply, public debt, and interactive variable were statistically significant. In the Two-Stage Least Square model, fitted inflation rate, fitted exchange rate, and fitted interest rate had coefficients that were statistically significant making the variables to be important determinants of share prices. This meant that the coefficients were significant in the model. The interaction of fiscal and monetary policies through inflation rate channel and exchange rate channel had a positive effect on share prices. The interaction of fiscal and monetary policies through interest rate had negative effect on share prices.

CHAPTER ONE

INTRODUCTION

1.1. Background of the study

Listed companies and governments trade their securities through the stock market. The performance of the stock market is a crucial indicator of performance of an economy. The users of the information released by the stock market include the government, the investors, and all other stakeholders. The stock market is a crucial economic institution that aids in capital formation and allocation. The market allows companies to be publicly traded and raise additional capital for expansion through selling of shares to the public. According to Aduda, Masila, and Onsongo (2012), stock markets play a fundamental role in the economic development of an economy. There are the intermediary links in facilitating the flow of funds from savers to investors. Further empirical evidence by Ashaolu and Ogunmuyiwa (2011) showed that capital market development matters for economic growth.

According to Kimani and Mutuku (2013), stock markets promote savings and investments by providing an avenue for investors and individuals to diversify their portfolio. They fuel economic growth through diversification, mobilization, and pooling savings from different parties and availing them for optimal utilization. A number of empirical evidences have linked fiscal and monetary policy and the stock markets (Bordo & Wheelock, 2004; and Laopodis, 2006). The monetary policy influences the stock prices but most of the studies showed that fiscal policy does not matter for stock prices. The interaction of the two policies is also believed to affect stock prices although there is scanty literature in the Kenyan case. According to Muscatelli and Tirelli

(2005) and Zoli (2005), the two policies interact through two major channels. These include the impact of government inter-temporal budget constraint on monetary policy and the effect of fiscal policy on monetary variables, such as inflation, interest and exchange rates. This study concentrates on the latter. The stock prices are believed to be determined by these monetary variables; inflation, interest rate, and exchange rate (Muradoglu et al., 2000). These variables affect cash flows used in calculating share prices.

Kenya being a developing economy has its share prices highly influenced by these monetary variables. The variables cause high stock volatility in the Nairobi Securities Exchange and if not well kept on check can lead to crisis in the stock market (Odhiambo, 2012). According to Nairobi Stock Exchange (1997), such markets suffer low trading volume, low turnover ratios, few limited companies, and inefficient delivery of information.

1.2. Nairobi Securities Exchange

The major activities that take place in the Nairobi Securities Exchange (formally the Nairobi Stock Exchange) include the exchange of shares of publicly quoted companies, government bonds, corporate and municipal bonds among other instruments. It was formed in 1954 as a voluntary organization of stockbrokers and is currently one of the most active markets in Africa. According to Kenyan Capital Market Authority (2014), NSE plays an important role in the process of economic development. It helps in mobilizing domestic savings thereby bringing about reallocation of financial resources from dormant to active agents, liquidation of long-term investments, and raising extra capital by companies among others. The benchmark index used for equities traded in Nairobi Securities Exchange is the NSE20-share Index. It represents the

geometric mean of share prices of NSE's 20 top stocks. It was introduced in 1964 but the stocks appearing in the top 20 has been changing over time. In February 2006, NSE All Share Index (NASI) was also introduced to capture market capitalization of all the NSE's listed equities traded in a day. The investors in NSE earn an income from speculation where they buy stocks at lower prices and sell them when prices soar. They also earn a share of the listed companies' profits in form of dividends.

1.3. The Stock Prices Performance in Kenya

The performance of stock market in Kenya is measured using the Nairobi Securities Exchange 20-share index (NSE20) and all share Index (ASI). NSE20 tracks the performance of 20 best performing companies listed on the Nairobi Securities Exchange. The companies are selected based on the weighted market performance for a 12 month period on the basis of market capitalization, volume of shares traded, number of deals and stock turnover. The performance of NSE20 between 2006 and 2014 is shown in the diagram that follows:



Figure 1.1: NSE 20 Share Index from January 2008 to January 2014

Source: Waithaka (2014)

The performance of stock market in Kenya is influenced by general performance and the nature of current economic situation in the country. The economic situation in the country is indicated by such monetary variables as interest rate, inflation, and exchange rate. Figure 1.1 above shows that the NSE20 has been fluctuating over time. There was poor performance in the year 2008 and 2012 while 2009, 2011, 2013 and 2014 shows a steady growth in share prices. The fluctuations in share prices in the NSE could be ascribed to monetary variables which mark the interaction of fiscal and monetary policies. Increase in price levels without compensating productivity leads to inflation. The purchasing power of individuals reduces and can only buy fewer goods. They have little cash left to invest in stocks. The demand of stocks thus falls and prices move in the same direction. When government finances budget deficits through taxation (for example Value Added Tax), there are inflationary pressures in the economy which would eventually affect share prices. High interest rates mean that the cost of borrowing is high. Companies are constrained from funding their expansion through borrowing. The cost of borrowing for individual to invest in share prices is high and therefore demand for shares is low. If the government borrows in foreign currency to finance its deficits, it may raise the taxes in order to repay the loans which will put inflationary pressures on the local currency (Zoli, 2005). The situation worsens and it becomes harder for investors to invest in stocks. The share prices will head further south.

1.4. Fiscal Policy and Share Prices

Fiscal policy is a tool for promoting sustainable growth and reducing poverty. The global economic crisis of 2008-2009 made fiscal policy gain prominence when governments stepped in to support financial systems, jump-start growth and mitigate the impact of the crisis (Munkhammar, 2012). Before 1930, the approach of limited government control in the economy

prevailed. The global economic crisis of 1930 characterized by stock market crash and the great depression made the policy makers to push for government to play a more proactive role in the economy (Nanto, 2009). When stability prevailed, countries scaled back the size and the function of government and let the market take the role of allocation of goods and services. When global financial crisis of 2008 threatened worldwide recession, countries returned to more active fiscal policy. The government applies fiscal policy through changing the level and types of taxes, the extent and composition of spending, and the degree and form of borrowing (Munkhammar, 2012). The government through taxation, public spending, and borrowing directly and indirectly influence the way resources are allocated in the economy.

The relationship between fiscal policy and share prices has not been given much attention in the existing literature. However, there are a few studies (Darrat, 1988; Jansen et al. 2008; Laopodis, 2008; Ardagna, 2009; Laopodis, 2010; Agnello and Sousa, 2010 and Afonso and Sousa, 2011) that have been done in this area. Although Darrat (1988) had found that fiscal policy had been virtually ignored in representing policy actions influence on stock market, it was demonstrated that fiscal deficits exerts significant negative effects on share prices. Laopodis (2008) also found that fiscal deficits affect stock markets. This is contrary to Ricardian Equivalence perspective that budget deficits do not matter for stock prices.

Expansionary fiscal policy increases aggregate demand directly while contractionary fiscal policy reduces aggregate demand by lowering spending. The fiscal policies of the government may be short-term or long-term in nature. Short-term policies focus on macroeconomic stabilization and include expanding spending or cutting taxes to stimulate an ailing economy.

Lowering spending or increasing taxes may be used to tame rising inflation. This means that fiscal policy measure could interfere with monetary policy objectives like price stabilization.

1.5. Monetary Policy and Share Prices

The policy is maintained through actions such as increasing the interest rate, open market operations, or changing the amount of money banks need to keep as reserves. These actions affect the investors' participation in the stock market. For instance, changing the reserve ratio by central bank leaves the commercial banks with little money that they could lend out to investors.

Stock prices reflect economic developments to a great extent and can be used by monetary policy authorities in policy decisions (Mishkin, 2001). Stock market performance, therefore, responds to both the monetary policy decisions but also gives feedback to central banks regarding the expectations of private sector about key macroeconomic variables future changes. The monetary variables like inflation, interest rate, and exchange rate have been found to influence share prices. Most of the studies (Ehrmann & Fratzscher, 2004; Nemaorani & Galebotswe, 2012 and Gali & Gambetti, 2013) have used interest rate, inflation, and exchange rate as proxies for monetary policy when studying its effects on share prices. The general conclusion was that there is a positive relationship between monetary policy and share prices.

1.6. Interaction of Fiscal and Monetary Policies

The monetary-fiscal policy mix arises from the fact that both types of policies have impact on key macroeconomic variables which in turn creates interdependencies in the pursuit of policy objectives. The two policies use different policy instruments, but they are closely related in terms of achieving certain objectives by affecting the levels of output in the economy. The close

relationship between monetary and fiscal policies carries with it the possibility of conflict and sub-optimal policies, if they are implemented at cross purposes (Swanepoel, 2004). The policy mix could include a combinations of expansionary and restrictive policies, with a fiscal stance being either supportive or non-supportive of monetary policy.

According to Muscatelli and Tirelli (2005), there are three major channels through which fiscal and monetary policies may interact. Firstly, fiscal policy may affect economic growth and prices through discretionary fiscal policy stabilization. Secondly, the operation of automatic stabilizers can contribute to reducing short-term volatility. Thirdly, governments have some instruments at their disposal that have a quick or even immediate effect on prices, such as VAT rates and also affect other monetary variables like interest rate and exchange rate (Muscatelli & Tirelli, 2005 and Zoli, 2005).

A coordinated monetary-fiscal policy interaction can be mutually reinforcing and effective. Lack of proper coordination of these policies could be potentially dangerous as it may lead to slow growth of the economy and cause surges in inflation (Nyamongo, Sichei & Mutai, 2010). According to Muscatelli and Tirelli (2003), fiscal and monetary policies tend to move in opposite directions. This means that tightening (or easing) of one policy means easing (tightening) the other. They can also be tightened or eased concurrently but each does much less when they move in the same direction.

1.7. Statement of the Problem

Stock markets acts as a link between the borrowers and the lenders thus playing a key role in economic development. According to Junkin (2012), stock markets improve savings and facilitate a more efficient allocation of resources. Companies, through the stock markets, are able to raise capital for expansion in more efficient ways. The stock markets provide a chance for companies to sell their stocks to potential investors in a more coordinated manner like the Initial Public Offers.

According to Kalui (2004), the share prices for the companies listed in the Nairobi Securities Exchange have been very volatile. The shares are very responsive to the economic conditions. Following the global economic crisis of 2007, the share prices in Kenya dropped (Nairobi Securities Exchange Limited, 2011). This was attributed to the depreciation of Kenya shilling against the US dollar. The stock market became volatile and investor's confidence was affected. Investment in the stock market became unattractive and share prices fell.

Most of the studies done on the effect of fiscal and monetary policies on stock prices have been done for developed markets (Ehrmann & Fratzscher, 2004; Grauwe, 2008; Afonso & Sousa, 2009; Da, Warachka & Yun, 2012; Gali & Gambetti, 2014). The studies done in Kenya are few but also concentrated on the fiscal and monetary policies independently or macroeconomic variables and their effects on share prices (Chirchir, 2009 & Ouma, 2014).

Kenya as an emerging market has limited studies about interaction of fiscal and monetary policies and its effect on share prices. The two policies interact via two major channels (government inter-temporal budget constraints on monetary policy and effects of fiscal policies on monetary variables such as inflation, exchange rate, and interest rate) which if not well understood will cause information asymmetry in the stock market (Muscatelli & Tirelli, 2005). The consequences of this information asymmetry are that there will be bad and uninformed decisions by the shareholders, brokers, and other stakeholders. The investors holding securities for speculation purposes might be adversely affected where the two policies are not well coordinated. Their expectations will be affected because share prices are not predictable. To assess the effects of the interaction of the two policies on share prices, this study focused on the effect of fiscal policy on monetary variables, such as inflation rate, interest and exchange rates. Examining the interaction of fiscal and monetary policy and its effect on share prices is important because share prices play a major role in economic development. The policy makers would need this information in order to understand which channels of interaction of the two policies to control to create a great environment for the investors. There is, therefore, a need to examine the interaction of fiscal and monetary policies and its effect on share prices. This study focused on how the interaction of fiscal and monetary policies through inflation, interest rate, and exchange rate affect share prices in Kenya.

1.8. Research Questions

- i. What is the relationship, using inflation channel, between interaction of fiscal and monetary policies?

- ii. How does the interaction of fiscal and monetary policies, using exchange rate, relate to share prices?
- iii. What is the relationship, using interest rate, between the interaction of fiscal and monetary policies and share prices?

1.9. Objectives of the Study

The general objective of this study is to establish the relationship between interaction of monetary and fiscal policies and share prices on the Nairobi Securities Exchange. The specific objectives of the study were to:

- i. Find out, using inflation channel, the relationship between the interaction of fiscal and monetary policies and share prices.
- ii. Determine, using exchange rate channel, how the interaction of fiscal and monetary policies relate to share prices.
- iii. Establish, using interest rate channel, the relationship between the interaction of fiscal and monetary policies and share prices.

1.10. The significance of the study

This study provided the information that is lacking in Kenyan stock market about interaction of fiscal and monetary policies and share prices at the Nairobi Securities Exchange. Policy makers in the stock market will use this information to formulate policies which will create stability in share prices. They will understand what direction the share prices are likely to move when fiscal and monetary measures interact. The investors who have not considered the interaction of the two policies in adjusting their portfolio will have more information.

1.11. The Scope and Organization of the Study

The study covered a period from January 2006 to December 2014 and the quarterly data was used. The variables of interest in the study were interest rate, exchange rate, and inflation rate.

The study focused on the interaction of fiscal and monetary policies through these variables and on share prices. The study focused on the Nairobi Securities Exchange and used NSE20 Share Index as the measure of share prices.

The organization of the study is as follows: Chapter one is introduction, chapter two literature review, chapter three methodology, chapter four empirical findings, and chapter five summary, conclusion, and policy implications of the study. The literature review entailed theoretical literature about the theories of interaction of fiscal and monetary policies. It also reviewed empirical literature on the interaction of fiscal and monetary policy and share prices. The methodology in chapter three comprised of research design, data type, data collection methods, and data analysis procedure. Chapter four comprised of the presentation and discussion of the research results. Chapter five entailed the summary of the study, conclusion and policy implications.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

There are three major sections addressed in this chapter; the theories addressing the interaction of fiscal and monetary policy and how this interaction relate to share prices, the empirical literature, and critique of the literature reviewed.

2.2. Theoretical Literature

Fiscal and monetary policies interaction is complex because it entails direct and indirect channels in which fiscal policy could have an impact on monetary policy and vice versa. Fiscal policy may interact with monetary policy via the impact of government intertemporal budget constraints on monetary policy and the effect of fiscal policy on monetary variables such as inflation, interest rate and exchange rates. According to Muscatelli and Tirelli (2005) and Zoli (2005), the two demand-side policies interact through the effect of fiscal policy on monetary variables such as inflation rate, interest rate, and exchange rate. The three variables (inflation rate, interest rate, and exchange rate) are macroeconomic variables and their relationship with stock prices are mostly captured using Arbitrage Price Theory, Efficient Market Hypothesis, and Market Hypothesis. The interaction of fiscal and monetary policy through inflation rate, Exchange rate, and Interest rate is captured by the New Keynesian Model and Mundel-Fleming Model.

2.2.1. New Keynesian Model

Keynes looked at the effect of fiscal policy on the economy through the aggregate demand approach. It is based on the assumption that there is existence of price rigidity and excess

capacity so that outputs are determined by aggregate demand. Increase in government spending has, or tax cuts have a multiplier effect on by stimulating additional demand for household consumer goods. Tax cuts increase disposable income and in turn affect demand. The key multiplier effect is higher marginal propensity to consume (MPC) as disposable income increases. Increase in demand for goods and services causes inflationary pressures as prices of consumer goods increases. The Keynesian model also allows the divisional crowding out effect through changes in interest rate and exchange rates. Increase in government expenditure shifts the IS curve to the right causing an increase in income levels and interest rates. The increase in interest rate is caused by increase in income resulting from an increase in demand for real money balances. According to Keynesian, therefore, the fiscal policy and monetary policy interact through Inflation and interest rate. The fiscal policy affects monetary variables inflation and interest rate.

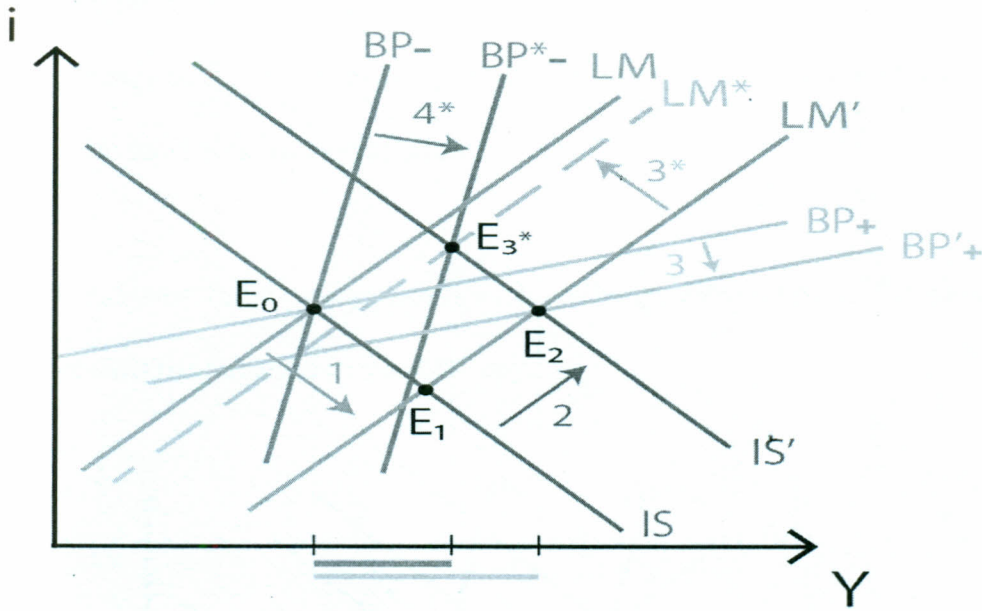
2.2.2. Mundel-Fleming Model

The Mundel-Fleming model is an extension of IS-LM model with balance of payments. The theory assumes a small open economy and analyzes the impact of macroeconomic policy (Fiscal and monetary) on it under a fixed exchange rates regime or a flexible exchange rate regime. In a fixed exchange rate regime, the central bank keeps the price of national currency stable by buying or selling foreign currencies. The balance of payments curve remains constant. It is only possible where a country has sufficient official reserves. If a county experiences a long-term balance of payments deficit, the central bank will have to devalue the national currency at some point. In a flexible exchange rate regime, the exchange rate may adjust to the changes in national

and foreign economic situations. The Balance of payments curve can, therefore, move upwards and downwards depending on whether the national currency appreciated or depreciated.

The model included the concept of capital mobility in its analysis. Capital mobility is taken as the ability of capital to move from one country to another. The capital can either be mobile or immobile. However, the degree of mobility or immobility differs from country to country. Perfect mobility and immobility may not be real in practice. A study by O'Connell, Maturu, Mwega, Ndung'u, and Ngugi (2010) revealed that Kenya has imperfect capital mobility. This study will, therefore, assume a case of imperfect capital mobility.

According to Central Bank of Kenya (2013), Kenya has been having deficits in the current account and net foreign reserves. The fixed exchange rate regime will, therefore, not be used in this study. The study, therefore, employed Mundel-Fleming model in a flexible exchange rate regime and imperfect capital mobility. The channel of interaction between fiscal and monetary policy selected for this study is the effects of fiscal policy on monetary variables (interest rate, inflation, and exchange rate). The Model, therefore, analyzed Fiscal policy under flexible exchange rates. However, to capture the interaction of the two policies, both expansionary fiscal and monetary policies were analyzed. This is shown in Figure 2.1



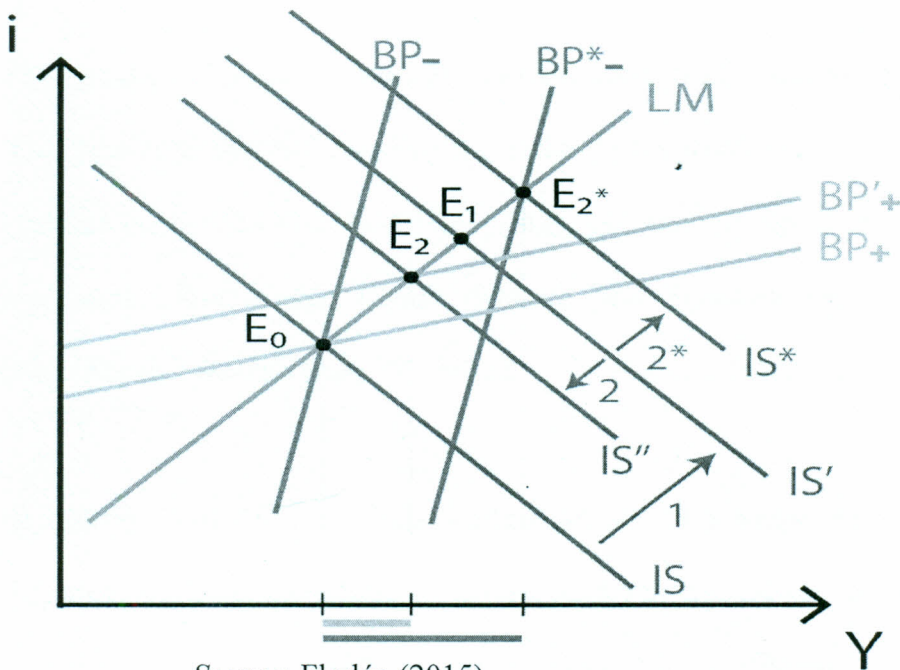
Source: Flodén (2015)

Figure 2.1: Expansionary monetary policy under flexible exchange rates and imperfect capital mobility

An expansionary monetary policy will shift the LM curve to the right, which makes the equilibrium go from point E_0 to E_1 . However, since now exchange rates are flexible and the balance of payments a deficit, the domestic currency will weaken against foreign currencies. This will increase net exports, shifting the IS curve to the right. Also, since domestic assets are less expensive, the BP curve will shift to the right (to either $BP'+$ or $BP'-$). Therefore, with high capital mobility, final equilibrium will be at point E_2 . However, with low capital mobility, the equilibrium will settle at E_3^* . At this equilibrium, the interest rate and output are higher than at E_0 . Increase in output will create the need for more employment. As a result, the rate of inflation will decrease based on Philip's Curve theory. The variables interest rate, inflation, and exchange rate are increasing with expansionary fiscal policy. High interest rate means high cost of accessing credit and, therefore, investors will not borrow to invest in stocks causing the demand of stocks to fall. Low demand will mean low prices. High inflation reduces the purchasing power of investors means they buy goods and services at high prices than before. They are left with

little to invest in shares, leading to low demand and prices of shares. High exchange rate means weak currency which increases the price of imports and their trading prices in the local market. It leads to the same situation as inflation.

For expansionary fiscal policy with flexible exchange rate and imperfect capital mobility, Figure 2.2 represents the situation in the economy.



Source: Flodén (2015)

Figure 2.2: Expansionary Fiscal policy under flexible exchange rate and imperfect capital mobility.

In Figure 2.2, an expansionary fiscal policy will shift the IS curve to the right, moving the equilibrium from point E_0 to point E_1 . Now, depending on capital mobility, we'll either have a balance of payments surplus (high capital mobility, BP_+ curve) or a balance of payments deficit (small capital mobility, BP_- curve). In the case of a balance of payments surplus, and considering flexible exchange rates, the domestic currency is likely to appreciate. This will decrease net exports, which will shift the IS' curve to the left. Also, since domestic assets are more expensive,

the BP+ curve will shift to the left. The final equilibrium will therefore be at point E_2 . If there is a balance of payments deficit (the case for the BP- curve), the result will be the same one as in the monetary policy with E_2^* as the final equilibrium. The rate of interest will be higher and output higher. This will cause inflationary pressures. Therefore, three variables, interest rate, inflation, and exchange rate will increase meaning that they will reduce activities in the stock market with low demand of share and reduced prices.

Hsing (2004) studied how fluctuations of macroeconomic indicators affect output in Brazil in order to prescribe monetary and fiscal policy. Hsing in the study extended the Mundel-Fleming model to capture the variables relevant in that study. The relationship examined is as follows:

$$Y = f(\text{Real Interest Rate, Budget Deficit, External Debt, Domestic Debt, Real Exchange Rate, Stock Market, Foreign Interest Rate, Oil Price}) \dots \dots \dots 2.1$$

Dimitrova (2005) study on The Relationship between Exchange Rates and Stock Prices borrowed from Hsing extended Mundel-Fleming model to capture the factors in the model that influences stock prices. The results in the extended Mundel-Fleming model related to the author's interest, Dimitrova (2005) drew the relationship between stock prices and interest rate quite differently. With reference to the literature reviewed and variables of interest in Dimitrova study, output, inflation, and exchange rate were considered to be the variables affecting share prices and were put in the following relation.

$$SP = f(Y, INF, E) + \dots \dots \dots 2.2$$

Still Dimitrova stated the variables of interest to the study but indicated that there could be more factors not captured. The variables of interest in this study (inflation, exchange rate, and interest rate) could be extracted from the extended Mundel-Fleming model and related as follows:

$$SP = f(R, INF, ER) + \dots \dots \dots 2.3$$

Function 2.3 can be represented by the following equation:

$$SP_t = \lambda_0 + \lambda_i b_i + \varepsilon_t \dots \dots \dots 2.4$$

Where SP_t share is price at period t , λ_i are coefficients of independent variables, and b_i are monetary variables (Inflation, Interest Rate, and Exchange rate) through which fiscal and monetary policies interact to affect share prices. The term λ_0 is the share prices at $\lambda_i = 0$.

2.3. Empirical Literature

2.3.1. Monetary Policy and Share Prices

Stock markets play a multidimensional role in monetary policy decision making. The performance of stock market is affected by innovations in the monetary policy through a number of channels. Mishkin (2001) investigated the transmission mechanism and the role of asset prices in monetary policy in the United States. The study involved a review of literature on the monetary policy transmissions and identified three categories of assets which are the channels through which monetary policy affects the economy. The assets categories included Stock market prices, real estate prices, and exchange rates. According to Mishkin (2001), stock prices reflect economic developments to a great extent and can be used by monetary policy authorities in policy decisions. Stock market performance, therefore, responds to both the monetary policy decisions but also gives feedback to central banks regarding the expectations of private sector

about key macroeconomic variables future changes. One of the channels that the monetary policy affects the economy is the interest rate channel. A change in interest rate affects corporate cost of capital and consequently the present value of the firm's net cash flows. Higher interest rate results to lower present values of future net cash flows and consequently lower stock prices. This is the traditional Keynesian view of interest rate transmission. There is also inflation rate. Milo (2012) found out that high inflation is always accompanied by serious imbalances in public finances. Milo study revealed in all cases of inflationary crises, the country showed significant budget deficits before the crisis, more pronounced still during the crisis and clearly below the average during the recovery and after the crisis. Kapur (2010) also revealed that inflation is increased by increase in money supply. The other channel is exchange rate channel. According to Ndung'u (2000), monetary shocks drive real exchange rate movements, and real Exchange rate movements have an impact on monetary shocks. The study by Krugman and Obstfeld (2006) also revealed that an increase in a country's money supply causes its currency to depreciate and a decrease in a country's money supply causes its currency to appreciate. Hopper (2012) found that that increase in government debt (public debt) will have a positive impact on exchange rate.

Ehrmann and Fratzscher (2004) analyzed the effect of US monetary policy on stock markets. The study used 500 individual stocks comprising the S&P500. It was found that on average, a tightening of 50 basis points reduces stock returns by 3%. Stock prices or returns were found to react more strongly when no change had been expected, when there is a directional change in the monetary policy stance in a period of high market uncertainty. There was a significant effect on monetary policy on the share prices.

A study by Nemaorani and Galebotswe (2012), investigated the impact of monetary policy on stock prices in Botswana using Vector Autoregressive Model. The study used a sample of 129 observations between January 2001 and September 2011. The interest rate was used as a proxy for monetary policy. There was a negative relationship between interest rate and stock prices. A contractionary monetary policy would contract aggregate demand and subsequently lead to an increase in stock prices.

Gali and Gambetti (2013) used Vector-Autoregressive Model with time-varying parameters to study on the effects of monetary policy on stock market bubbles in the United States. The study used quarterly U.S. time series for GDP and its deflator, the World Bank commodity price index, the federal funds rate, and the S&P500 stock price index and the corresponding dividend series (both deflated by the GDP deflator). The baseline sample period was 1960Q1-2011Q4. The stock prices increased persistently in response to an exogenous tightening of monetary policy. The relationship between monetary policy and share prices was, therefore, positive.

2.3.2. Fiscal Policy and Share Prices

The existing literature has given little attention to the role of fiscal policy in influencing asset prices. However, there are exceptions of Darrat (1988), Jansen, Li, Wang, and Yang, 2008, Laopodis (2008), Ardagna (2009), Laopodis (2010), Agnello and Sousa (2010), Afonso and Sousa (2011). A study by Otuori (2013) on Influence of exchange rate determinants on the performance of commercial banks in Kenya revealed that increase in budget deficit will increase exchange rate fluctuation because the country with huge budget deficits will be less attractive to investors.

Darrat (1988) study on fiscal policy and the stock market in Canada used Vector Error Correction Model. The results indicate the presence of significant lags in the reaction of stock prices to fiscal policy moves. Darrat further found out that fiscal deficit exerts a highly significant negative effect on current share prices. The study further refutes the ECM hypothesis and indicated that stock prices do not reflect all the information available in the stock market.

The study by Laopodis (2008) explored the dynamic linkages among federal budget deficit, monetary policy, and the stock market using time series data for 1960 to 2004 in the United States using Vector Autoregression Framework. The results of the analysis done revealed that budget deficits affect stock markets. This faulted the view of the Ricardian Equivalence perspective that budget deficits do not matter for the stock markets. Further analysis by Laopodis using taxes and government spending indicated that stock markets are more sensitive to taxes relative to spending. There were more economically significant results when he replaced market returns with before and after tax corporate profits and excess market returns. Lopodis (2008) study created credence that unexpected increases in the federal funds rate leads to reduction in expected stock returns and subsequently lowering corporate profits. The corporate tax revenues also decline as a result. Further analysis using inflation along with the deficits, fed funds rate, and stock prices showed that stock markets absorbs inflation information before setting asset prices This is because the analysis indicated a negative response of stock market to inflation innovations. The study further supported stock market efficiency hypothesis since it did not support the hypothesis that monetary policy actions impact the activities in the stock market.

A study by Ardagna (2009) used a panel of OECD Countries from 1960 to 2002 to investigate Financial Markets' Behavior around Episodes of Large Changes in the Fiscal Stance. The sample included several countries including Australia, Austria, Belgium, Canada, Denmark, France, Germany, Ireland, Italy, Japan, the Netherlands, New Zealand, Spain, Sweden, the United Kingdom, and the United States. The Ordinary Least Squares method was used to estimate the financial behavior around episodes of large changes in the fiscal stance. The study found that Stock market prices surge around times of substantial fiscal tightening and plunge in periods of very loose fiscal policy. The 'fiscal adjustments that occur in country-years with high levels of government deficit, that are implemented by cutting government spending, and that generate a permanent and substantial decrease in government debt are associated with larger reductions in interest rates and increases in stock market prices' (Ardagna, 2009, pg. 1).

Agnello and Sousa (2010) studied the role that fiscal policy play in explaining the dynamics of asset market. A panel data of ten industrialized countries, was used. The Panel-data Vector Autoregression model was used which combined the Panel-data approach with traditional Vector Autoregression approach. The countries included in the sample are Belgium, Finland, France, Germany, Italy, Netherlands, Spain, Portugal, U.K and the U.S. The study found that there is an important gap in literature between fiscal policy and development in asset prices. The research by Agnello and Sousa (2010) also demonstrates that there is an immediate temporary negative response of stock prices to fiscal shocks.

Afonso and Sousa (2011) studied separately the relationship between revenue and expenditure components of the fiscal deficit and share prices. The study demonstrated that government

expenditure shocks have a negative effect on stock prices while government revenue shocks have a small positive effect.

Hsing (2013) examined the potential impacts of fiscal and monetary policy on the stock market in Poland using GARCH Model. The results showed that stock Poland stock market index is not affected by the fiscal policy. The ratio of government deficits or debt to GDP was the fiscal policy proxies.

2.3.3. Interaction of Fiscal and Monetary Policies

Dixit and Lambertini (2000: 2001) did a study on exploring the interdependence between the fiscal authority and the central bank in a model where the latter has only partial control over inflation, which is also directly affected by fiscal policy. The results were that the rules of the two policies are compliments at equilibrium when fiscal expansions have non-keynessian effect on output and inflation. According to Muscatelli et al. (2003), there are some models (New Keynesian dynamic general equilibrium model, Mundel-Fleming Model, and game-theoretic models) which have been used to examine the interdependence between fiscal and monetary policies.

The monetary and fiscal policies interaction arises from the fact that both types of policies have an impact on key macroeconomic variables which in turn creates interdependencies in the pursuit of policy objectives. The two policies use different policy instruments, but they are closely related in terms of achieving certain objectives by affecting the levels of output in the economy.

The close relationship between monetary and fiscal policies carries with it the possibility of

conflict and sub-optimal policies, if they are implemented at cross purposes (Swanepoel, 2004). The policy mix could consist of various combinations of expansionary and restrictive policies, with a fiscal stance being either supportive or non-supportive of monetary policy.

According to Muscatelli and Tirelli (2005) and Zoli (2005), the interaction arises as both monetary and fiscal policy has implication for the output gap and inflation. The two policies interact through (i) the impact of government inter-temporal budget constraint on monetary policy and (ii) the effect of fiscal policy on monetary variables, such as inflation, interest and exchange rates. Inter-temporal budget constraints require that increase in government expenditure be financed by increase in taxation, borrowing, or seignorage. Deficit financing results to monetary growth that leads to higher inflation. According to Zoli (2005), an additional implication of an unsustainable fiscal policy is the increased default probability and sovereign risk premium, which can lead to capital outflows and currency depreciation. If the country debt is dominated by foreign currency, the depreciation of exchange rate will cause further increase in the country's debt burden. This might result to a vicious cycle since exchange rate depreciation will cause inflationary pressures which require interest rates to increase even further.

A study by Kirsanova et al. (2009) concluded that monetary policy should focus on business cycle stabilization and inflation checks while fiscal policy concentrates on government debts or deficits. Nevertheless, should monetary policy be constrained in any way, the fiscal policy should be employed in controlling inflation and business cycle stabilization. This is in keeping with recent years' empirical findings (Fragetta & Kirsanova, 2010) that fiscal policy is important in smoothening business cycle and avoiding deflation, especially in economies hitting zero lower

bound for interest rates. In support of this, government securities purchase conducted by some central banks would be seen as a monetary policy control supporting fiscal stimulus in attaining output and inflation stability. Alternatively, the move could be seen as a kind of monetary financing and central banks seen as playing fiscal dominance.

According to Canzoneri et al. (2011), most of the studies have modeled the interaction between fiscal and monetary policy as a non-cooperative game between the government and the central bank, each pursuing its own objectives over inflation, output, and other macro-variables. Afonso and Sousa (2011) emphasized the need to integrate monetary and fiscal policy analysis into one framework in which the interaction and effects of both can be analyzed.

The interaction of fiscal and monetary policies through inflation rate, exchange rate, and interest rate was found to be the most ideal way of studying the impact of interaction on share prices. A study by Sachs and Larrain (1993) on Macroeconomics in the Global Economy in the US revealed that the origin of extreme inflation rates in many countries of Latin America lies mainly in persistent and very high budget deficits, so that their financing has also been assured through the monetary means. According to Mukherjee and Naka (1995), the effects of money supply on share prices can either be negative or positive. A study by Mukherjee and Naka (1995) on the dynamic Linkage between Macroeconomic Variables and the Japanese Stock Market: An Application of a Vector Error Correction Model showed that the negative effect that inflation and exchange rate may have on share prices may be countered by the economic stimulus that is provided by money growth.

On determinants of exchange rate, a study by Milo 2012 on the impact of the budget deficit on the currency and inflation in the transition economies showed that a deficit in current account due to spending more of its currency on importing products than it is earning through sale of exports causes depreciation. A study by Hopper (2012) found that increase in government debt (public debt) will have a positive impact on exchange rate. For interest rate, Kiptui study on Macroeconomic Variables, Volatility and Stock Market Returns: A Case of Nairobi Securities Exchange, Kenya showed that money supply and public debt play a key role in determining interest rate.

2.3.4. Overview of Literature

Most of the studies (Ehrmann & Fratzscher, 2004; Grauwe, 2008; Afonso and your payment, we will try to send some this weekend Sousa, 2009; Da, Warachka & Yun, 2012; Gali & Gambetti, 2014; Chirchir, 2009; Ouma, 2014) have reviewed fiscal and monetary policies effects on share prices independently thus ignoring the concept of their interaction. According to Muscatelli and Tirelli (2005) and Zoli (2005), the interactions of the two policies arise as both monetary and fiscal policy has implication for the output gap and inflation. The two policies interact through (i) the impact of government inter-temporal budget constraint on monetary policy and (ii) the effect of fiscal policy on monetary variables, such as inflation, interest and exchange rates. The New Keynesian and Mundel-Fleming models reviewed showed that the two policies interact through inflation, interest rate, and fiscal policy. The study adopted Mundel-Fleming model that will capture both goods and money markets.

The relationships between these channels and stock prices have attracted a number of studies. Jawaid and Haq (2012) studied the Effects of interest rate, exchange rate and their volatilities on stock prices and found that there is a significant negative long run relationship between exchange rate and short term interest rate and share prices. Uddin (2009) found a negative relationship between interest rate and share prices. Dilrukshan, Simpson and Evans (2009) studied the interaction between stock prices and exchange rate in Australia and found positive co-integrating relationship between these variables. Ambunya (2012) found out that exchange rates movement greatly affected stock market returns volatility. Ouma (2014) found out that money supply, exchange rate, and interest rate affect stock prices in Kenya. Money supply and interest rate had positive effects while exchange rate had negative effects. There a gap in literature because no studies have been done in Kenya on the effects of interaction of fiscal and monetary policies on share prices. This shortcoming is what this study resolved. The study evaluated the effects of interaction of fiscal and monetary policies through interest rate, inflation, and exchange rate on share prices.

CHAPTER THREE

METHODOLOGY

3.1. Introduction

This chapter outlines the methodology applied in realizing the objectives stated in chapter one. The subsections in the chapter include research design, theoretical framework, and empirical model specification. The chapter also highlights the type of data, source, and the procedure adopted in analysis.

3.2. Research Design

The aim of this study was to investigate the interaction of fiscal and monetary policy and its effects on share prices using a case of Nairobi Securities Exchange. The study adopted a non-experimental research design. Time series data for share prices, inflation, exchange rate, and interest rate will be used. The relationships between these variables were determined using Two-Stage Least Squares Method. The relationships between each variable and stock price were determined.

3.3. Theoretical Framework

The Mundel-Fleming theory was adopted for this study. The model is an extension of IS-LM model with balance of payments. Since in this study the interaction of fiscal and monetary policies was found to take place via government inter-temporal budget constraints and the effects of fiscal policy on monetary variables (Interest rate, exchange rate, and inflation rate), the fiscal policy under flexible exchange rate regime and imperfect capital mobility was used. Kenya faces deficits in the official foreign reserves and current account. The fixed exchange rate regime is

desirable where an economy has adequate official foreign reserves. Kenya also experiences imperfect capital mobility.

- The expansion of fiscal and monetary policies under flexible exchange rate and imperfect capital mobility as shown in Figure 2.1 led to increase in inflation, exchange rate, and share prices which were found to cause reduction in the demand of shares in the stock exchange causing share prices to fall. A variable of interaction of the two policies was obtained through Money supply (Monetary policy variable) and Budget deficit (Fiscal policy deficit). The interaction of fiscal and monetary policy affected share prices which in turn affected share prices as shown in the conceptual framework in Figure 3.1.

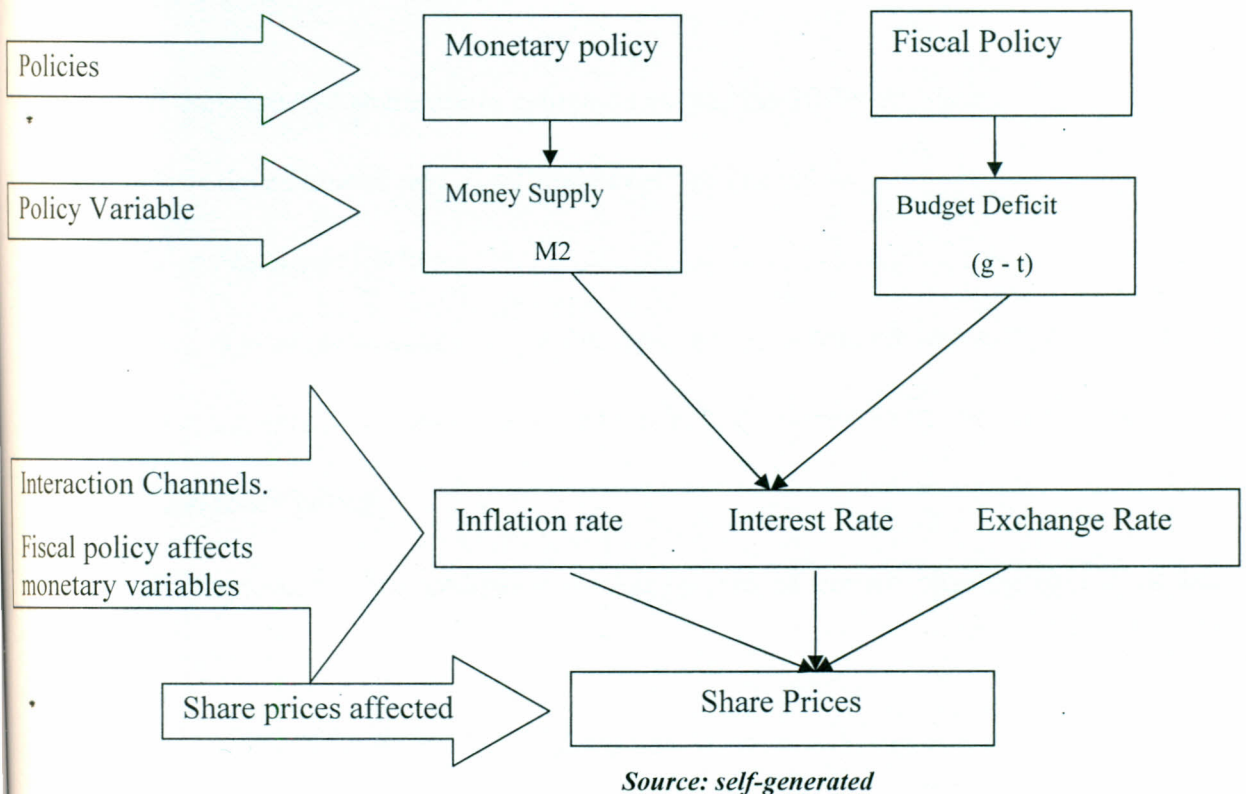


Figure 3.1: How fiscal and monetary policies interact to affect share prices

Figure 3.1 above demonstrated that fiscal and monetary policies can be interacted through money supply and budget deficit. The interaction variable obtained affected inflation rate, interest rate, and exchange rate. These three variables were estimated and their effects on share prices measured.

3.4. Empirical Model

The study objectives were achieved through estimating a set of equations through Two-Stage Least Squares method (2SLS). The variables in the system were related as per the following expressions:

$$SP = f(\Pi^*, ER^*, R^*) \dots \dots \dots 3.1$$

Where,

⇒ SP Represented share prices estimated as the NSE20-Share Index.

⇒ Π^* Is the estimated rate of inflation expressed as below,

$$\Pi^* = f\{m, (g-t), m^*(g-t)\} \dots \dots \dots 3.2$$

In this case, m is money supply, t is a tax rate, g is government expenditure ($g-t$) is budget deficit that represents fiscal policy and the term $m^*(g-t)$ represents the interaction variable for fiscal and monetary policy.

⇒ ER^* Represented the estimated exchange rate of Kenya shilling to US dollar. It is estimated as

$$ER^* = f\{m, cad, pd, (g-t), m^*(g-t)\} \dots \dots \dots 3.3.$$

In this case, cad is the current account deficit and pd is public debt.

⇒ R^* is the estimated rate of interest that is expressed as follows

$$R^* = f\{m, pd, (g-t), m^*(g-t)\} \dots \dots \dots 3.4$$

The equations estimated, therefore, were as follows:

$$SP = \beta_0 + \beta_1 \Pi^* + \beta_2 ER^* + \beta_3 R^* + \varepsilon) \dots \dots \dots 3.5$$

$$\Pi^* = \alpha_0 + \alpha_1 m + \alpha_2 (g-t) + \alpha_3 m^*(g-t) + \mu \dots \dots \dots 3.6$$

$$ER^* = \varphi_0 + \varphi_1 m + \varphi_2 cad + \varphi_3 pd + \varphi_4 (g-t) + \varphi_5 m^*(g-t) + \ell \dots \dots \dots 3.7$$

$$R^* = \lambda_0 + \lambda_1 m + \lambda_2 pd + \lambda_3 (g-t) + \lambda_4 m^*(g-t) + \nu \dots \dots \dots 3.8$$

3.6. Definition and Measurement of Variables

Share price - A share price is the price of a single share of a number of saleable stocks of a company, derivative or other financial asset. The share prices in the Nairobi Securities Exchange were represented by the NSE20 Share index for the purpose of this study. It was measured as the geometric mean of the share prices of 20 best performing stocks in the Nairobi Securities Exchange.

$$NSE20 = \sqrt[n]{\prod_{i=1}^n x_i}$$

Where $n = 20$ (the number of stocks involved) and x_i are the share prices of the 20 best performing stocks in the Nairobi securities exchange.

Inflation Rate (Π) - The rate at which the general level of prices for goods and services is rising, and, subsequently, purchasing power is falling. Inflation was measured as the consumer

price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services. $\Pi = \frac{CPI_{t+1} - CPI_t}{CPI_t}$

With CPI_t as the consumer price index of period t and CPI_{t+1} as the Consumer price index of time $t+1$.

Exchange rate (ER_t) - It is the Price for which the currency of a country can be exchanged for another country's currency. The rate at which Kenya shilling is traded for US dollar

Interest Rate (R) - The amount charged, expressed as a percentage of principal, by a lender to a borrower for the use of assets. The monthly average of the 91-day Treasury Bill Rate is used as the proxy for domestic interest rate.

Money Supply (M2) - The entire stock of currency and other liquid instruments in a country's economy as of a particular time. The money supply can include cash, coins and balances held in checking and savings accounts.

M2 = Coins and notes in circulation and other money equivalent + short-term time deposits in banks and 24-hour money market funds.

Public Debt (pd) - The total financial obligations incurred by all governmental bodies of a nation. Measured as the amount of money the government owes its lenders.

Current Asset Deficit (cad) - A measurement of a country's trade in which the value of goods and services it imports exceeds the value of goods and services it exports.

3.7. Data Type and Source

Time series data for inflation rate, exchange rate, interest rate, and share prices (NSE20Share Index) were used in this study. The quarterly data for Inflation rate, exchange rate, and interest

rate were collected from Central Bank of Kenya. The monthly data on NSE20Share Index was collected from Nairobi Securities exchange.

3.8. Data Collection

The data used in this study was collected from Nairobi Securities Exchange and Central Bank of Kenya. The quarterly data for money supply, current account deficit, public debt, government deficit, inflation rate, interest rate, and stock prices (NSE20Share Index) were collected for the period between 2006 and 2014 giving 36 observations.

3.9. Data analysis

The data analysis involved estimation of equations using Two-Stage Least Squares (2SLS). The estimated value of inflation, exchange rate, and interest rate were computed and then used as regressors in the Two-Stage Least Square model with share prices as the dependent variable. The coefficients of the estimated variables in the regression equations were tested for significance using t-distribution tests. The tests were done at 95% confidence level.

a) Finding out using inflation channel, the relationship between the interaction of fiscal and monetary policies and share prices.

To capture the effects of interaction fiscal and monetary policy on share prices through inflation channel, the following

$$\frac{\partial SP}{\partial [m^*(g-t)]} = \frac{\partial SP}{\partial \Pi^*} * \frac{\partial \Pi^*}{\partial [m^*(g-t)]} \dots\dots\dots 3.9$$

$$A = B * C$$

Where A is the coefficient of the interaction variable that was used to measure the effect of interaction of fiscal and monetary policies on share prices via the inflation channel. It was

obtained through the product of change in share prices with respect to inflation and change in inflation with respect to change in interaction variable. That is B*C.

b) Determining using exchange rate channel, how the interaction of fiscal and monetary policies relate to share prices.

$$\frac{\partial SP}{\partial [m^*(g-t)]} = \frac{\partial SP}{\partial R^*} * \frac{\partial R^*}{\partial [m^*(g-t)]} \dots\dots\dots 3.10$$

$$A = B * C$$

The coefficient (A) represented the effects of interaction of fiscal and monetary policies on share prices through interest rate channel. The coefficient was obtained by the product of change in share prices with respect to interest rate (B) and the change in interest rate with respect to interaction channel (C).

c) Establishing using interest rate channel, the relationship between the interaction of fiscal and monetary policies and share prices.

$$\frac{\partial SP}{\partial [m^*(g-t)]} = \frac{\partial SP}{\partial ER^*} * \frac{\partial ER^*}{\partial [m^*(g-t)]} \dots\dots\dots 3.7$$

The effects of interaction of fiscal and monetary policies on share prices through exchange rate is obtained by the multiplication of change in share prices with respect to exchange rate and change in exchange rate with respect to interaction variable. The coefficients were tested for significance at 95 percent confidence level. This means that the level of significance will be 0.05 or 5 percent. The decision criterion was based on the fact that if the p-value of the t-statistics of the independent variable is less than the level of significance, then the variable is significant. The interaction coefficients was checked if they are less than zero, zero, or greater than zero to assess the impact it has on the share prices.

CHAPTER FOUR

EMPIRICAL FINDINGS

4.1. Introduction

The chapter presents the results, interpretation, and discussion. The results of descriptive statistics, unit root tests, multicollinearity tests, cointegration, and diagnostic tests are presented in this chapter. The empirical results are presented, interpreted and discussed.

4.2. Descriptive Statistics

Table 4.1 shows the descriptive statistics which include the mean, standard deviation, and Jarque-Bera test for both dependent and independent variables between January 2006 and December 2014.

Table 4.1. Mean, Standard Deviation, and Distribution of Variable series

Variable	Mean	Std. Dev.	Jarque-Bera	P-Values for Jarque-Bera test
NSE20 Share Index	4318.21	761.784	2.258	0.323
Inflation (INF)	8.498	5.016	5.599	0.061
Exchange Rate (ER)	79.175	8.313	1.767	0.413
Interest Rate	7.959352	3.286	28.438	0.000
Budget Deficit (g-t)	108489.8	88763.290	10.407	0.006
Public Debt (PD)	1346032	515483	3.227	0.199
(Current Account Deficit) CAD	-52620.08	23965.87	2.303	0.316
Money supply(M2)	1071158	435068.4	2.552	0.279

Source: Computations from Research Data

From table 4.1, the average for NSE20 Share Index series was 4318.210. The standard deviation was 761.784 which were above zero meaning that the values were adequately varied from the mean. This means that NSE20 Share Index was varied overtime making it fit for inclusion in

regression analysis. The null hypothesis that NSE20 Share Index Series was normally distributed could not be rejected because the p-value of Jarque-Bera of 0.323 was greater than the level of significance of 0.05.

The mean for inflation was 8.498 with a standard deviation of 5.016. The standard deviation showed that the values of inflation were varied over the period covered by the study making it fit to be used in regression analysis. The p-value of Jarque-Bera test statistics 0.061 was greater than the level of significance of 0.05. This meant that the series was normally distributed because the null hypothesis that the series is normally distributed could be rejected.

The exchange rate had a mean of 79.175 and a standard deviation of 8.313346 which showed that their values were varied over the period covered by the study. The variation was necessary for a variable to be used in the regression analysis. The p-value of Jarque-Bera test statistic was 0.413 which was greater than the level of significance of 0.05. The null hypothesis that the series was normally distributed was, therefore, not rejected.

The interest rate series had a mean of 7.959 and the standard deviation of 3.286 percent. The standard deviation being above zero means that the values were varied around the mean and could be used in regression analysis. The p-value of the Jarque-Bera test was 0.000 and was less than the level of significance of 0.05. This meant that the null hypothesis that the series was normally distributed was rejected. The series was, thus, not normally distributed.

The mean of budget deficit series was 108489.8 and standard deviation of 88763.29 which was big compared to the mean meaning that the values were highly varied from the mean, a condition that favors the use of the series in regression analysis. The p-value of the series' Jarque-Bera test statistic was less than the level of significance meaning that the null hypothesis that the series is normally distributed was rejected. The series was, therefore, not normally distributed.

Public debt mean was 1346032 million and the standard deviation was 515483 meaning that the series values were moderately scattered from the mean. This meant that the values were fit to be used in statistical analysis. The Jarque-Bera test statistic had a p-value of 0.199 and was greater than the level of significance. This means that the null hypothesis could not be rejected. The series was normally distributed.

The current account deficit series had values scattered from the mean because the mean was 52620.08 and the standard deviation was 23965.87. They were varied overtime making it possible to use them in regression analysis. The current account deficit series was also normally distributed because the null hypothesis that the series is normally distributed could not be rejected at five percent level of significance. The p-value of 0.316 was greater than the level of significance.

The money supply was 1071158 million on average. Having a standard deviation of 435068.4 meant that the series values were varied over time. The series was found to have a normal

distribution because the p-value of 0.279 was greater than the level of significance of 0.05. The null hypothesis that the series is normally distributed was not rejected.

The normal distribution tests enable the researcher to determine the kind of test to use when analyzing data. The properties of normal distribution was used in conducting analysis of variables in the regression analysis using Student's t-distribution in this study because most of the series were found to be normally distributed. The mean was proven to be a reliable measure of central tendency.

4.3. Testing Time Series Properties

4.3.1. Unit Root Test Results

The test for stationarity was crucial because a non-stationary series lead to spurious regression analysis. When using Ordinary Least Squares method (OLS), the regression of nonstationary series will have t-statistics that show that a relationship exists when in reality there is no such relationship. This leads to difficulties in forecasting. Stationarity of time series data in this study was done using Augmented Dick-Fuller (ADF). The ADF statistic tests the null hypothesis that the series has unit root against the alternative hypothesis of, no unit root. If a series is found to have no unit root, then it is stationary. The null hypothesis was rejected at 5 percent level of significance if the Computed ADF test statistic was greater than the critical values at the stated level of significance. The ADF test results are shown in table 4.2.

Table 4.2 Stationarity test results

Variable		ADF Statistic	Critical Value(5%)	Conclusion
NSE 20 Share Index	Level	-2.519458	-2.9499	Nonstationary
	1st Difference	-3.5665	-2.9527	Stationary
Exchange Rate	Level	-1.171153	-2.9499	Nonstationary
	1st Difference	-4.5441	-2.9527	Stationary
Inflation	Level	-3.919822	-2.9342	Stationary
Interest Rate	Level	-3.463988	-2.9499	Stationary
Current Account Deficit	Level	0.123276	-2.9499	Nonstationary
	1st Difference	-6.850374	-2.9527	Stationary
Public Debt	Level	3.172963	-2.9499	Stationary
Money Supply	Level	3.688233	-2.9499	Stationary
Government Deficit	Level	-4.369083	-2.9499	Stationary

The ADF results in Table 4.2 showed that inflation rate, interest rate, public debt, money supply, and government deficit were stationary at levels. The ADF test statistics for these series were greater than the critical values at 5 percent level of significance. The null hypothesis that the series have unit root was therefore rejected concluding that they were stationary. The NSE20 Share Index, exchange rate, and current account deficit were non stationary 5 percent level of significance. Their ADF test statistics were less than the critical values at 5 percent level of significance meaning that the null hypothesis of existence of unit root could not be rejected. The series were however stationary at first difference at 5 percent level of significance. Hence, the three variables' series were concluded to be integrated of order 1.

4.3.2. Testing for Multicollinearity

This test was done to find out if the predictors in the regression analysis are correlated. If the predictors are highly correlated, then it would result to large variance of the coefficient estimates thereby affecting the predictors. The test for multicollinearity was done using Pair-Wise Correlations coefficients among regressors. According to Gujarati (2008), the issue is not

absence of correlation but the degree of correlation among predictors that can cause a problem in estimation. If Pairwise Correlation coefficient between two regressors is high (greater than 0.8), then multicollinearity is a serious problem (Gujatari, 2004). The significance of the correlations was determined by performing t-test of simple correlation coefficients. Table 4.3 that follows shows the correlation matrix. The t-statistics for the correlation coefficients were computed to determine the significance of correlation coefficients and they are indicated in the brackets in Table 4.3.

Table 4.3. Pair-wise Correlation Matrix and their corresponding t-statistics

Variables	NSE20 Share Index	Inflation	Interest Rate	Exchange Rate	Public Debt	Current Account Deficit	Money Supply	Budget Deficit
NSE20 Share Index	1.00							
Inflation	-0.12 (-0.68)	1.00						
Interest Rate	-0.34* (2.11)	0.53* (3.62)	1.00					
Exchange Rate	-0.52* (3.46)	0.19 (1.11)	0.01 (0.03)	1.00				
Public Debt	-0.06 (-0.37)	-0.05 (-0.28)	-0.22 (-1.29)	0.35* (2.12)	1.00			
Current Account Deficit	0.06 (-0.36)	-0.17 (-0.98)	0.02 (0.13)	-0.34* (-2.10)	-0.39 (-2.42)	1.00		
Money Supply	0.21 (1.23)	-0.11 (-0.61)	-0.29* (-1.72)	0.10 (0.56)	0.67* (5.15)	-0.05 (-0.31)	1.00	
Budget Deficit	0.11 (0.62)	-0.05 (-0.30)	0.06 (0.36)	-0.27 (-1.63)	-0.33* (-2.01)	0.38* (2.39)	0.04 (0.21)	1.00

(*) means significant at 5 percent

The negative sign in the correlation matrix mean that the two variables tend to increase or decrease together. A correlation coefficient of between zero and 1 meant that the variables tend to decrease or increase together as in case of interest rate and inflation, exchange rate and

inflation rate, exchange rate and interest rate. The correlation coefficient of between -1 and zero meant that one variable increases as the other decreases (for instance, interest rate and NSE20 Share Index, inflation rate and NSE20 share index, Exchange rate and NSE20 share index, Public debt and NSE20 share index).

The critical value of t was computed at 5 percent level of significance and 33 degrees of freedom to give 1.69 for all correlation coefficients. The decision criterion was that if the calculated t-statistic was greater than 1.69, then the null hypothesis that there is no correlation between variables was rejected. Though NSE20 share index and interest rate, inflation and interest rate, NSE20 share index and exchange rate, Public debt and exchange rate, current account deficit and exchange rate, money supply and interest rate, current account deficit and public debt, money supply and public debt, budget deficit and public debt, and budget deficit and current account deficit were found to be significantly correlated, their correlation was below 0.8. All the correlation coefficients for the independent variables in this study were below 0.8 meaning that the variables could still be used as regressors.

4.3.3. Co-Integration Test Results

Johansen-Juselius (1990) cointegration test was performed to determine whether there exist long-run relationships among variables. The nonstationary time-series would pose a major problem for empirical econometrics if they are regressed together. They will cause spurious regression, uninterpretable t-ratios, too high goodness of fit measures, making the regression results rather difficult to evaluate. The appeal of cointegration is that it provides a formal framework for testing long-run models from actual time-series data. The cointegration technique allows nonstationary data to be used so that spurious regression results are avoided. It also gives the chance to test the validity of an economic theory. If a postulated economic relationship exists, then the variables under consideration should be cointegrated. Testing for cointegration is, thus, a test for the existence of the equilibrium relationship postulated. In a sense, this is a test whether or not a model is well specified.

The Eigenvalue statistic were used to determine whether cointegration exist among variables in this study. Cointegration is said to exist if the values of computed statistics are significantly different from zero. Thus, if the likelihood ratio for each eigenvalue exceeds the critical values at 5 percent and 1 percent levels of significance, the null hypothesis of no cointegration is rejected.

Table 4.4 shows cointegration test results.

Table 4.4. Cointegration Test Results

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.897672	304.5671	156.00	168.36	None **
0.847662	229.3412	124.24	133.57	At most 1 **
0.832013	167.2467	94.15	103.18	At most 2 **
0.761746	108.3790	68.52	76.07	At most 3 **
0.511741	61.04322	47.21	54.46	At most 4 **
0.479035	37.38521	29.68	35.65	At most 5 **
0.354212	15.86681	15.41	20.04	At most 6 *
0.042595	1.436450	3.76	6.65	At most 7
*(**) denotes rejection of the hypothesis at 5%(1%) significance level				
L.R. test indicates 7 cointegrating equation(s) at 5% significance level				

Table 4.4 shows that the likelihood ratio for the first seven rows is greater than the critical values meaning that the null hypothesis is rejected. This means that there are at least seven cointegrating vectors in the system. This means that the variable used in the determination of the effects of interaction of fiscal and monetary policy have a genuine long-run relationship. The NSE20, exchange rate, and current account deficit which were nonstationary did not lead to spurious regression because they were found to be cointegrated in the long-run. They had a genuine long-run linear relationship. This means that interest rate, inflation rate, money supply, budget deficits, current account deficit, Nairobi Stock Exchange 20 share index and public debt variables used in this study will not lead to spurious regression when used in regression analysis.

4.4. Diagnostic Tests

The 2SLS model used in the study involved first estimating the values for inflation, exchange rate, and interest rate. Inflation rate was regressed against money supply, budget deficit, and interactive variable as the regressors. The fitted values were then retrieved from Eviews. Exchange rate was regressed against money supply, current account deficit, public debt, budget deficit, and interactive variable. The fitted values were then retrieved from eviews after estimating the exchange rate equation. The interest rate was regressed against money supply, public debt, budget deficit, and interactive variables as regressors. The equation was estimated using Eviews and the fitted values were retrieved. The fitted values for inflation, exchange rate, and interest rate were then used in the regression analysis as regressors and share prices as the regresand variable.

Various diagnostic tests were carried out to test the appropriateness of the inflation rate equation, exchange rate equation, interest rate equation, and 2SLS model. The stability, serial correlation, normality, and heteroscediaticity tests for the four models were conducted. These tests are explained below.

The first diagnostic test was Serial correlation test. Serial correlation arises where residuals of one period are related to the residuals of the previous period. Presence of serial correlation means that the OLS estimates of the standard errors will be smaller than the actual standard errors. This will lead to the conclusion that the parameter estimates will be presented as being more precise than they are. This will cause a tendency to reject the null hypothesis when it should be rejected.

Breusch-Godfrey Serial Correlation LM test was used to determine the presence of serial correlation. The null hypothesis of the test is that there is no serial correlation. If the probability value (p-value) of the LM test statistic is greater than 5 percent, the null hypothesis of no serial correlation is not rejected. The results on Breusch-Godfrey (1988) Serial Correlation LM Test are presented in table 4.5.

Table 4.5. Breusch-Godfrey Serial Correlation LM Test

<u>Model</u>	<u>Test Statistic</u>			<u>P-value</u>	<u>Conclusion</u>
Inflation Equation	F-statistic	Level	61.64655	0.000000	There is Serial Correlation
	Obs*R-squared	Level	28.95467	0.000001	There is Serial Correlation
	F-statistic	Differenced	6.783142	0.4865	No Serial Correlation
	Obs*R-squared	Differenced	10.87135	0.4611	No Serial Correlation
Exchange Rate Equation	F-statistic	Level	0.937157	0.404114	No Serial Correlation
	Obs*R-squared	Level	2.271949	0.321109	No Serial Correlation
Interest Rate Equation	F-statistic	Level	43.59436	0.000000	There is Serial Correlation
	Obs*R-squared	Level	27.01462	0.000001	There is Serial Correlation
	F-statistic	Differenced	5.410548	0.10310	No Serial Correlation
	Obs*R-squared	Differenced	9.755993	0.07612	No Serial Correlation
2SLS	F-statistic		2.331166	0.115128	No Serial Correlation
	Obs*R-squared		4.847603	0.088584	No Serial Correlation

Table 4.5 shows that the p-values for the Exchange rate equation and 2SLS models were greater than 0.05 level of significance meaning that the null hypothesis of no serial correlation could not be rejected. This meant that the models had no serial correlation. This was desirable for the estimated model. The inflation and interest rate equation models had p-values less than 0.05

levels of significance meaning that there was serial correlation. According to Gujarati (2004), serial correlation can be removed using the first difference of regressors and regresand. This is appropriate where the Durin-Watson is greater than the coefficient of determination R-squared. In this case, the Durbin-Watson was 0.37884 and R-squared was 0.638. The resultant p-values were greater than 0.05 level of significance meaning that the model did not have serial correlation when differenced.

The second diagnostic test was Heteroscedasticity Test. Heteroscedasticity occurs when the variance of the residuals from a model is not constant. The presence of heteroscedasticity leads to an overly large variance of the coefficients which in turn causes the t-ratios to give inaccurate results. The coefficients will likely be insignificant while they are significant in real sense. Test for presence of Heteroscedasticity was done using White Heteroskedasticity Test. The null hypothesis for the White test was of no Heteroscedasticity. If the p-value of the test statistics is less than 0.05, the null hypothesis of homoscedasticity is rejected at 5 percent level of significance. Failure to reject the null hypothesis means that there is no heteroscedasticity (that is homoscedasticity). The results are presented in table 4.6.

Table 4.6. White Heteroskedasticity Test results:

<u>Model</u>	<u>Test Statistic</u>		<u>P-value</u>	<u>Conclusion</u>
Inflation Equation	F-statistic	0.947418	0.477132	No Heteroskedasticity
	Obs*R-squared	5.900109	0.434473	No Heteroskedasticity
Exchange Rate Equation	F-statistic	1.224979	0.324953	
	Obs*R-squared	11.82745	0.29677	No Heteroskedasticity
Interest Rate Equation	F-statistic	1.045362	0.428208	
	Obs*R-squared	8.513566	0.384975	No Heteroskedasticity
2SLS	F-statistic	1.417359	0.243043	
	Obs*R-squared	8.153738	0.227055	No Heteroskedasticity

The p-values of the heteroscedastic tests for the four models were greater 0.05 thus the null hypothesis of homoscedasticity could not be rejected at 5 percent level of significance. This implies that the residuals from the four models had constant variances which are statistically desirable for the 2SLS Model.

The third diagnostic test was Normality Test. The error term of the regression model should follow normal distribution. This is an assumption of a good regression model. The Jarque Berra statistics was used to test for normality. The null hypothesis was that error term was normally distributed. The null hypothesis was rejected if the p-value of Jacque-Bera test is less than the level of significance. Table 4.7 represented the normality test results for inflation equation, exchange rate equation, interest rate equation, and Two-Stage Least Square model.

Table 4.7. Test Results for Normality Using Jacque-Berra Test

	Jacque-Bera Test Statistic	P-Value
Inflation Equation	4.899	0.083
Exchange Rate Equation	6.828	0.053
Interest Rate Equation	36.105	0.054
Two-Stage Least Square model	5.512	0.063

For inflation equation, the p-value was 0.086324 that was greater than the level of significance of 0.05 meaning that the series was normally distributed. For exchange rate equation, the residuals were normally distributed because the p-value of the test was greater than the level of significance. This led to the decision of not rejecting the null hypothesis. For interest equation, the p-value was greater than the level of significance meaning that the residuals were normally

distributed meaning that the equation could be regressed without violating the OLS assumptions of normality. The 2SLS had Jarque Bera Statistics of 5.512 and p-value of 0.064 which was greater than p-value of 0.05. The null hypotheses for the models were not rejected for each case. The residuals of all the models were normally distributed thus fulfilling the assumption of a good regression model. The models were therefore fit to be regressed.

The fourth diagnostic test was Stability test. The CUSUM test was used to test parameter stability. It is based on cumulative sum of recursive residuals. The cumulative sum is plotted together with 5 percent critical line. According to Brown, Durbin, and Evans (1975), the parameter is stable only if the cumulative sum of recursive residual plot is within the two plotted critical values line. For inflation equation, exchange rate equation, interest rate equation, and Two-Stage Least square model had their cumulative sum of recursive residual plot is within the two plotted critical values line. This means that the models were stable. All diagnostic tests have shown that the 2SLS model was appropriate to be used in the study.

4.5. Regression Results.

The study sought to investigate the interaction of fiscal and monetary policies and the effects on share prices at the Nairobi Securities Exchange as a case study. The interaction channels for fiscal and monetary policies used were inflation rate channel, exchange rate channel, and interest rate channel. The study used the Two-Stage Least Square method where inflation rate, exchange rate, and interest rate were estimated first and their fitted values obtained using Eviews. The equations used to estimate inflation rate, exchange rate, and share prices included an interactive term that represented the effect of the interaction of fiscal and monetary policies on each of the

dependent variables in each equation. The interactive term was a variable obtained by the product of government deficit and money supply. The NSE20 share index was then regressed against the estimated values of inflation rate, exchange rate, and interest rate. The coefficients of interactive variable in the interaction channels equations was multiplied by their corresponding coefficients of fitted variables in the 2SLS model to capture the effect of interaction of fiscal and monetary policies on share prices through each of the interaction channels.

4.5.1. Interaction through Inflation Rate Channel

To capture the interaction of fiscal and monetary policies and share prices through the inflation channel, the inflation equation was estimated. Inflation was regressed against money supply, budget deficit, and interactive variable. The interactive variable was obtained by multiplying budget deficit and money supply. The fitted values of inflation were obtained after the regression. Table 4.15 represented the regression results for inflation equation.

Table 4.8. Regression results for inflation equation

Dependent Variable: Inflation Rate			
Independent Variables	Coefficient	t-Statistic	Prob.
Constant	0.475534	0.410957	0.6839
Money Supply	0.0000127**	2.54	0.015823
Government Deficit	0.0000592**	3.020408	0.004766
Money supply*Government deficit	0.00521**	2.959992	0.005571
Coefficient of Determination R²		F-Statistics	
R-squared	0.818	F-statistic	3.342**
Adjusted R-squared	0.638	Prob (F-statistic)	0.0383
(**) means significant at 5 percent			

The coefficients of money supply, government deficit, and interaction variable were found to be significant because their p-values were less than the level of significance (0.05). The null hypothesis that the coefficients were not significantly different from zero was rejected. This meant that the coefficients were significantly different from zero. The coefficient of money supply was positive. This implies that a unit increase in money supply resulted to increase in inflation rate by 0.0000127. Government deficit had a positive coefficient meaning that its increase by one unit would increase inflation rate in the economy by 0.0000592. The fiscal and monetary policies interaction through (money supply * government deficit) showed that the two policies interact to cause upsurge in inflation rates. This is because the coefficient of interaction variable was positive meaning that a unit increase in the interaction variable would cause inflation to increase by 0.00521. Thus, inflation had money supply, government deficit, and interactive variable as its significant determinants. Milo (2012) found out that high inflation is always accompanied by serious imbalances in public finances. Milo study revealed in all cases of inflationary crises, the country showed significant budget deficits before the crisis, more pronounced still during the crisis and clearly below the average during the recovery and after the crisis.

According to Sachs and Larrain (1993) the origin of extreme inflation rates in many countries of Latin America lies mainly in persistent and very high budget deficits, so that their financing has also been assured through the monetary means. The study also concurred with findings of Milo (2012) that monetary expansion has played a determinant role regarding the inflation rate. The study concurred with the findings of Kapur (2010) that increase in money supply leads to

increase inflation. The relationship of money supply and inflation is positive as shown by the positive coefficient of money supply in the inflation equation.

4.5.2. Interaction through Exchange Rate Channel

The exchange rate was regressed against money supply, current account deficit, public debt, budget deficit, and interactive variable to obtain the fitted values to be used in the 2SLS model.

Table 4.17 shows the regression results for exchange rate equation.

Table 4.9. Regression results for exchange rate channel

Dependent Variable: Exchange Rate			
Variable	Coefficient	t-Statistic	Prob.
Constant	60.19031	15.569	0
Money supply	-0.0000151**	-2.738	0.009
Current account deficit	-0.00337**	-2.932	0.006
Public debt	0.0000120	0.728	0.472
Budget deficit	0.0000357**	2.098	0.043
Money supply* budget deficit	-0.00194**	-2.733	0.0098
R-squared	0.775810	F-statistic	20.763
Adjusted R-squared	0.738445	Prob(F-statistic)	0.000

(**) meant significant at 5 percent level of significance

Table 4.17 showed that money supply, current account deficit, budget deficit, and interactive variable were important determinants of exchange rate. This was because p-values of their coefficients were less than 5 percent level of significance. Public debt was not an important determinant of exchange rate because the p-value of its coefficient was greater than 5 percent

level of significance. Money supply had a negative coefficient. This implied that its increase by one unit would decrease the exchange rate by 0.0000151. Current account deficit increase would lead to decrease in the exchange rate because it had a negative coefficient. A unit increase in the current account deficit would cause a 0.00337 decrease in exchange rate. The coefficient of public debt was positive and its increase by one unit would increase exchange rate by 0.0000120. The budget deficit had a positive relationship with the exchange rate meaning that its increase by one unit would decrease the exchange rate by 0.0000357. The interactive variable had a negative coefficient. This meant that fiscal and monetary policies interaction decrease exchange rate by 0.00194. The p-value of F-statistics was less than 5 percent level of significance meaning that the variables in the exchange rate equation were jointly important.

According to Ndung'u (2000), monetary shocks drive real exchange rate movements, and real exchange rate movements have an impact on monetary shocks. That is, they drive each other. The increase in money supply leads to weakening of domestic currency because it creates imbalance between domestic currency and foreign reserves. The study by Krugman and Obstfeld (2006) also revealed that an increase in a country's money supply causes its currency to depreciate and a decrease in a country's money supply causes its currency to appreciate. This concurred with the study that money supply and exchange rate have a negative relationship.

According to Milo (2012), a deficit in current account due to spending more of its currency on importing products than it is earning through sale of exports causes depreciation. Thus, balance of payment fluctuates exchange rate of its domestic currency. This is concurring with the study that current account deficit has a negative effect on exchange rate. The study concurred by the

findings of Hopper (2012) that increase in government debt (public debt) will have a positive impact on exchange rate. The argument is that a country with increasing public debt is less likely to acquire foreign capital. Regarding effects of government deficit on exchange rate, the study results were the same as that of Otuori (2013) that increase in budget deficit will increase exchange rate fluctuation because the country with huge budget deficits will be less attractive to investors.

4.5.3. Interaction through Interest Rate Channel

The interest rate equation was first estimated with money supply, public debt, budget deficit, and interactive variable as the independent variables. The aim was to obtain the fitted values of interest rate to be used in the 2SLS model. Table 4.10 shows the regression results of the interest rate equation.

Table 4.10. Regression results for interest rate equation

Dependent Variable: Interest Rate			
Variable	Coefficient	t-Statistic	Prob.
C	1.161907	1.485	0.148
Money supply	-0.0000270**	-3.089	0.004
Public Debt	-0.00000320**	-3.02	0.005
Governemnt Deficit	0.0000143	1.112	0.274
Money supply * Budget deficit	0.000156**	-2.017	0.052
R-squared	0.87546	F-statistic	3.353**
Adjusted R-squared	0.726	Prob(F-statistic)	0.021

(**) means significant at 5 percent level of significance.

Table 4.10 showed that money supply, public debt, and interactive variable were significant determinants of interest rate. Their p-values were less than 5 percent level of significance. Budget deficit and interactive variables had p-values greater than 5 percent level of significance meaning that they were not significant. The coefficient of money supply was negative meaning that a unit increase in money supply would reduce the interest rate by 0.0000270. Public debt also

had a negative coefficient meaning that increase in public debt would decrease interest rate by 0.00000320. The budget deficit had a positive coefficient. This implied that increase in budget deficit would increase interest rate by 0.0000143. The interactive variable had a zero coefficient meaning that interaction of fiscal and monetary policies has a positive impact on the interest rate. Its increase by one unit would increase exchange rate by 0.000156. The p-value of F-statistics was less than 5 percent level of significance meaning that the variables were jointly important determinants of interest rate. The study concurred with a number of studies about the determinants of interest rate. The study by Were and Wambua (2013) revealed that interest rate is determined by money supply, government borrowing that causes crowding out effect, public sector deficit among other factors. According to Folawewo and Tennant (2008), public debt, public sector deficits, and money supply are important determinants of interest rate spreads in Sub-Saharan African countries. For Kiptui (2014), money supply and public debt play a key role in determining interest rate. Though the study did not show budget deficit as an important determinant of interest rate, the interaction of fiscal and monetary debt through money supply and budget deficit was an important determinant of interest rate. The two factors interacted are important in determining the interest rate.

4.5.4. Two-Stage Least Squares Model Estimation

The share prices were regressed against the fitted values of inflation, exchange rate, and inflation rate in the 2SLS Model. The 2SLS regression results are shown in table 4.11.

Table 4.11. 2SLS regression results

Dependent Variable: NSE20 Share Index				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	4302.692**	173.1541	24.849	0.000
Fitted inflation	43.62588**	14.11263	-3.091	0.004
Fitted exchange rate	10.90342**	5.165431	2.111	0.042
Fitted interest rate	-12.30968**	6.008303	-2.049	0.048
R-squared	0.65462	F-Statistics		13.255**
Adjusted R-squared	0.62119	Prob(F-statistics)		0.028

(**) means significant at 5 percent level of significance

Table 4.11 showed that fitted inflation, fitted exchange rate, and fitted interest rate were important determinants of share prices at the NSE. This is because the p-values of their coefficients were less than 5 percent level of significance. This meant that the null hypothesis that the variable coefficient is not significant was rejected in each case. The coefficient of fitted inflation was positive meaning that a unit increase in fitted inflation would increase the NSE20 share index by 43.62588. The coefficient of fitted exchange rate was positive meaning that increase in the fitted exchange rate by one unit would increase NSE20 share index by 10.90342 units. According to Mukherjee and Naka (1995), the effects of money supply share prices can either be negative or positive. Fama (1981) showed that inflation and exchange rate being positively related to money supply and this means that they would also have either positive or negative effects on share prices. The negative effect that inflation and exchange rate may have on share prices may be countered by the economic stimulus that is provided by money growth (Mukherjee and Naka (1995). The net effect is increased cash flows and share prices. A study by Kirui, Wawire and Onono (2014) on Macroeconomic Variables, Volatility and Stock Market Returns revealed that exchange rate is an important determinant of stock prices. According to Dimitrova (2005), exchange rate is an important determinant of stock prices but the extent of the

effect depended on the whether the companies whose shares are analyzed relies much on imported products.

The fitted interest rate had a negative coefficient meaning that its increase by one unit would decrease the NSE20 share index by 12.30968. The F-statistic had a p-value of 0.028 that was less than the level of significance meaning that the variables were jointly important. The coefficient of determination showed that fitted inflation rate, fitted exchange rate, and fitted interest rate explained 65.462 percent of the variation in share prices at the NSE. According to Akwasi (2012), interest rate is an important determinant of share prices. The level of interest rate affects capital investment in the country. Low interest rates spur capital activities by companies which create employment opportunities, increase the level of income, output, and profitability by the companies. The companies give high level of dividends as a result which causes share prices to go up, hence the negative relationship of share prices and interest rate.

4.5.5. Effects of interaction of fiscal and monetary policies on share prices

Table 4.12 showed the effects of interaction of fiscal and monetary policies on share prices.

Table 4.12: Effects of interaction of fiscal and monetary policies on share prices

Channel	Coefficient Of Interaction Channel	Coefficient Of Relevant Variable In 2SLS	Effect Of Policies Interaction On Share Prices
Inflation Channel	0.00521	43.62588	0.227290835
Exchange Channel	-0.00194	10.90342	-0.021152635
Interest Channel	0.00000156	-12.30968	-1.92031E-05

An interactive variable was included in the inflation, exchange rate, and interest rate equations. The interactive variable was obtained by multiplying money supply by budget deficit. To capture the interaction of fiscal and monetary policies, the coefficient of the interactive variable in each of the three equations was multiplied by their corresponding coefficient in the 2SLS model.

For interaction through inflation, the coefficient of interactive variable in the inflation equation was multiplied by the coefficient of the fitted inflation in the 2SLS model and gave a positive product. This meant interaction of fiscal and monetary policies through inflation channel had a negative effect on share prices. It would lead to an increase in share prices by 0.227291.

For exchange rate, the coefficient of interaction variable in the exchange rate equation was multiplied by the coefficient of fitted inflation in the 2SLS model and the product was negative, meaning that interaction of fiscal and monetary policies through exchange rate has a negative relationship with the share prices in the NSE. A unit increase in the interaction through exchange rate channel would cause a 0.021 decrease in NSE20 share index.

For interest rate channel, the coefficient of interactive variable in the interest rate equation was multiplied by the coefficient of estimated interest rate in the 2SLS model. The product was negative meaning that there is negative relationship between the interaction of fiscal and monetary policies through interest rate and share prices.

The study has revealed that both monetary policy and fiscal policy plays a key role in determining the share prices at the Nairobi Securities Exchange. For instance, inflation was

found to be determined by money supply and budget deficit. In this case, money supply represented monetary policy and budget deficit represented fiscal policy. Inflation was also found to be an important determinant of share prices. Saleem, Yasir, Shehzad, Ahmed and Sehrish (2012) found budget deficit to be an important determinant of share prices. The study found a positive relationship between budget deficit and share prices. Money supply was also found to be significant determinant of share prices by Maskay (2006). The increase money supply raises interest rate that affects the discounted cash flow of share prices and hence the share prices. The study found money supply to be an important determinant on share prices. This means that fiscal and monetary policies have an important effect on inflation. The interaction of the two policies was also found to have an important impact on inflation rate. Interacting fiscal and monetary policies through money supply and budget deficit affected inflation rate which also affected the share prices. The interaction of the two policies through inflation channel was also found to increase share prices. The effect through inflation channel was found to be either positive or negative by Mukherjee and Naka (1995). The monetary growth that affects inflation rate could be countered by economic stimulus that is provided by the monetary growth in the economy.

The money supply and budget deficit were also found to be important determinants of exchange rate. The exchange rate was an important determinant of share prices at the Nairobi Securities Exchange but contrary to the findings of Hwang (2012) that exchange rate has a negative effect on share prices. The contrary findings were explained by the findings of Mukherjee and Naka (1995) that exchange rate and inflation can either have positive or negative effects on share

prices because they are directly linked to money growth. Money growth can cause economic stimulus that would increase cash flows and share prices of companies. The interaction of fiscal and monetary policies also was an important determinant of exchange rate. The exchange rate was an important determinant of share prices. The interaction of the two policies through exchange rate had negative effects on share prices meaning. This means that fiscal policy affects share prices through exchange rate and also their interaction.

The fiscal policy affected interest rate through public debt while monetary policy affected interest rate through money supply. Though government deficit was not an important determinant of interest rate, its combination with money supply which formed interactive variable was important determinant of interest rate. The resultant interest rate was an important determinant of share prices. According to Mishkin (2001), an increase in interest rate causes an impact on the corporate cost of capital which will in turn influence the present value of the firm's future net cash flow. Consequently, higher interest rates lead to lower present values of future net cash flows, which, in turn, lead to lower stock prices. The interaction of fiscal and monetary policies was found to have a negative effect on share prices. This means that fiscal and monetary policies and their interaction affect interest rate which also influence share prices. The interaction of the two policies through interest rate also had a negative effect on share prices.

The study concurred with the findings of Muscatelli and Tirelli (2005) and Zoli (2005) that fiscal and monetary policies interact through effects of fiscal policies on monetary variables like

inflation, exchange rate, and interest rate which in turn affect share prices. The findings of this study also concurs with the findings of Afonso and Sousa (2011) that emphasized the need to integrate monetary and fiscal policy analysis into one framework in which the interaction and effects of both can be analyzed. If they are not coordinated effectively, they will lead to misleading information in the stock market. The interaction of the two policies affects inflation rate, exchange rate, and interest rate and consequently influences the share prices. The study found evidence that we find evidence that the interaction between the two policies is very important in explaining stock market developments. Thus, investors and analysts in their effort to understand the relationship between macroeconomic policies and stock market performance should consider fiscal and monetary in tandem rather than in isolation.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND POLICY IMPLICATIONS

5.1. Introduction

The chapter entails a summary of the study, conclusions, and policy implications that can be obtained from the study findings. The areas of further research are also highlighted.

5.2. Summary

The purpose of the study was to determine the effect of interaction of fiscal and monetary policies on Nairobi Securities Exchange share prices. The specific objectives of the study were to: find out using inflation channel, the relationship between the interaction of fiscal and monetary policies and share prices, determine using exchange rate channel, how the interaction of fiscal and monetary policies relate to share prices and establish using interest rate channel, the relationship between the interaction of fiscal and monetary policies and share prices. The data used to achieve these objectives were quarterly data for the period between January 2006 to December 2014 for inflation rate, exchange rate, interest rate, public debt, money supply, budget deficit, current account deficit and Nairobi Securities Exchange 20-share index. Share prices were regressed against estimated values of interest rate, inflation rate, and exchange rate. Interest rate was estimated using money supply, public debt, government deficit, and interaction variable for fiscal and monetary policies. Inflation rate was estimated using money supply, government deficit, and interaction of fiscal and monetary variable. Exchange rate was also estimated using money supply, current account deficit, public debt, government deficit, and interaction of fiscal and monetary policies. The effects of the interaction of fiscal and monetary and fiscal policies and share prices were obtained using Two-Stage Least Square Method. The results showed that

the interaction of fiscal and monetary policies through inflation rate had a positive effect on share prices while interaction through exchange rate and interest rate had a negative relationship with share prices.

Inflation was found to be determined by money supply, government deficit, and interaction of fiscal and monetary policy. Inflation was also found to be an important determinant of share prices. The interaction of fiscal and monetary policy through inflation rate had a positive impact on share prices. This is because the product obtained by multiplying the coefficient of interaction variable in the inflation rate equation and coefficient of fitted inflation in the 2SLS equation was positive and statistically significant.

Exchange rate was determined by money supply, current account deficit, budget deficit, and interactive variable which were found to be important. The fitted exchange rate obtained in this regression was found to be an important determinant of share prices at the NSE. The interaction of the fiscal and monetary policies was found to be important determinant of exchange rate. The interaction of fiscal and monetary policies through exchange rate channel had a negative effects on share prices because the coefficient obtained by multiplying coefficient of interactive variable in the exchange rate equation and the coefficient of fitted exchange rate in the 2SLS equation was negative and statistically significant.

Interest rate was found to be significantly determined by money supply, public debt and interactive variable. However, budget deficit was not an important determinant. This regression analysis obtained fitted of interest rate which was an important determinant of share prices. The interaction of fiscal and monetary policies through interest rate channel was found to have a negative impact on share prices at the NSE. The product obtained by multiplying coefficient of interaction variable in the interest rate equation and the coefficient of fitted interest rate in the 2SLS model was negative.

5.3. Conclusions

From the study findings, the interaction of fiscal and monetary policies affects share prices through inflation rate, exchange rate. Inflation channel was found to have positive impact on share prices. This implied that increase in inflation rate as a result of interaction of fiscal and monetary policies would cause an increase in share prices. Exchange rate and interest rate channels had negative effects on share prices. This implied that increase in interaction of fiscal and monetary policies through

5.4. Policy Implications

Firstly, the government and central bank should ensure there is a well-coordinated fiscal and monetary policies to ensure that their interaction is not ignored which will have negative effects on investors' decisions to invest in stock market. It was found out that increase in inflation rate affected share prices positively while investor expectations would otherwise. Inflation effect on share prices was found in other studies to be either positive or negative. However, where central bank increase money supply which is expected to lead to high inflation and government may reduce taxes, the effects of inflation on share prices might be reversed. This will affect investors

who shied away from investing in share prices when money supply was increased for fear that it will affect share prices negatively. However, reduction in taxes will counter the reduction in purchasing power caused by increased inflation.

Secondly, a well-coordinated fiscal and monetary policies interaction will be needed to inform the investors about expected changes in interest rate. Increased money supply by the central bank will be expected to reduce interest rate. The investors will be able to borrow at low rates from commercial banks and invest in stocks increasing the demand of shares in the stock market and increased prices. However, if the government on the other hand increases taxation to finance a deficit, the disposable income by the investors will be less meaning that they shy away from borrowing to invest in shares. This would ordinarily reverse the expected result of share prices as a result of decreased interest rate. However, changes in the interest rate as an interaction channel for fiscal and monetary policies was zero. The policies should be well coordinated and investors should not analyze them independently when making investment decisions.

Thirdly, devaluation or revaluation of domestic currency is also plays a key role in the stock market and consequently affect investment decisions. Exchange rate increase means a currency is becoming weaker against foreign currencies, US Dollar in this case. This is expected to lead to low share prices due to inflationary pressures that it causes. If central bank devalues a local currency as a way of spurring economic growth through making imports expensive to boost local industries, the local industries may not respond at the same rate to meet the increasing demand

for local industries. This means there will be inflationary pressures in the economy and trading in the stock market will be affected due to reduced purchasing power of investors' income. The share prices will be expected to go down in that case and many will shy away from investing in them. However, if at the same period the government resolved to increase its international debt that will come in terms of foreign currency, the shilling will get stronger contrary to the central government policy and investor expectations. This will affect the decisions in the stock market. The two policies must be well coordinated to ensure their interaction is productive and informative to investors.

5.6. Areas for further Research

The study focused on the interaction of fiscal and monetary policies and its impact on share prices and used Nairobi Stock Exchange 20-share index. The study also used quarterly time series data and only the companies that participate in NSE20 share index were considered. Further research could focus on All Share Index to capture all stocks trading in the Nairobi Securities Exchange. More research could also focus on individual companies or sectors with companies listed in the Nairobi Securities Exchange and use annual data instead of quarterly data used in this study.

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APPENDICES

Table A1: RAW DATA ON VARIABLES

NSE20	INF	ER	R	g (Millions)	t (Millions)	g-t (Millions)	pd (Million)	cad (Millions)	m2 (Millions)
4110.023	8.8767	72.1	7.95	237820.7	164863.7	72957	746769.6	-20842.7	484956.7
4211.817	4.73	72.158	6.8767	328802.7	247830.7	80972	766603.8	-23640.3	514171.7
4541.49	5.0033	73.131	6.1	59879	43647.33	16231.67	796267.3	-21951.7	533742.7
5525.07	7.0567	71.014	6.3233	160490.3	114539.7	45950.6	799589.9	-26555	551037
5431.73	3.28	69.598	6.18	257599.3	187723	69876.3	797758.1	-27477.7	564606
5115.98	2.6267	67.448	6.65	366434	273586.3	92847.7	807516.8	-25654.7	591196
5286.087	5.4367	67.013	7.0567	64587	57428	7159	827075	-28471.7	624288.7
5210.41	5.72	65.213	7.3133	184438.3	145702.3	38736	844504.9	-28571.3	649189.3
4876.097	10.627	67.876	7.0433	318727	233551	85176	862269.9	-30798.7	690580.3
5232.473	17.533	62.646	7.6133	459150.7	329273.7	129877	868924	-27128	723174.3
4565.817	18.06	68.597	7.9133	71409.67	60509.67	10900	870135	-43045.7	726331.3
3416.277	18.703	77.624	8.2433	216437.7	160902.3	55535.4	921237.8	-40289.7	757128.7
2826.227	14.17	79.581	7.7733	350348.3	270138.3	80210	982882.2	-33510.3	770784.3
2982.41	10.21	78.446	7.3733	525475	385880.3	139594.7	1023362	-35705.7	800321
3127.063	7.5133	76.243	7.26	101148.7	67946	33202.7	1071800	-34737.3	836937
3173.54	5.6467	75.138	7.1	251535.7	180961.3	70574.4	1117708	-43763	883107.7
3755.873	5.0333	76.488	6.25	439118.7	293445.3	145673.4	1138810	-36019.3	938002.7
4271.443	3.6767	78.938	4.12	667149.7	423783.7	243366	1202999	-44694	1000393
4507.657	3.3333	80.926	1.8233	103726.7	74453	29273.7	1264628	-47344.7	1055491
4495.777	3.8433	80.581	2.2033	303449	207884	95565	1308351	-55685.7	1091455
4197.39	7.05	82.236	2.6067	493050	342675.7	150374.3	1373256	-55900.3	1129632
4025.15	13.16	86.124	5.8533	711925	495270.3	216654.7	1432570	-61372.3	1164449
3495.847	16.507	93.014	10.05	106408.3	83703	22705.3	1545224	-75175.7	1211263
3289.273	19.187	93.87	16.413	333098.7	231404.7	101694	1540868	-75757.3	1243905
3298.213	16.87	84.139	19.353	588644.3	378258.7	210385.6	1533514	-66042	1255047
3633.817	11.777	84.12	12.427	830269.7	553101.7	277168	1613471	-73898.3	1314226
3890.07	6.3833	84.276	10.217	142836.3	93675.33	49160.97	1679299	-72790.7	1386145
4121.273	3.53	85.578	9.0267	405979.3	260508	145471.3	1772630	-74374.7	1456090
4598.673	4.0767	86.721	8.78	674605.7	431072.3	243533.4	1792191	-73887.7	1468298
4790.117	4.3667	84.608	8.6833	1042355	654013.7	388341.3	1894544	-68185.3	1541420
4759.503	6.9967	87.255	8.51	136688.3	126334.3	10354	2005166	-77510.3	1582249
5006.91	7.4233	85.907	9.7267	405267.7	338324	66943.7	2085538	-81119.3	1649167
4911.78	6.78	86.327	9.1333	651029	544497.3	106531.7	2153244	-70212	1730680
4905.19	7.0333	87.247	9.1433	1005536	774624.3	230911.7	2242644	-87477	1815431
4923.2	7.5433	88.238	8.8167	150592	134124.3	16467.7	2368960	-108401	1876821
4945.9	6.18	89.878	8.63	492523.3	367268.3	125255	2404835	-96331.7	1949985

Table A2. INFLATION EQUATION

Dependent Variable: INFLATION

Method: Least Squares

Sample: 2006:1 2014:4

Included observations: 35

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.475534	1.157138	0.410957	0.6839
Money Supply	1.27E-05	4.99E-06	2.541234	0.0158
Budget Deficit	5.92E-06	1.96E-06	3.020408	0.0047
Money Supply*Budget Deficit	5.21E-03	0.001760	2.959992	0.0055
R-squared	0.81824	Mean dependent var		8.498426
Adjusted R-squared	0.638132	S.D. dependent var		5.015909
S.E. of regression	5.183966	Akaike info criterion		6.233457
Sum squared resid	859.9522	Schwarz criterion		6.409404
Log likelihood	-108.2022	F-statistic		3.342227
Durbin-Watson stat	0.378842	Prob(F-statistic)		0.038316

Table A3. EXCHANGE RATE EQUATION

Dependent Variable: EXCHANGE RATE

Method: Least Squares

Sample: 2006:1 2014:4

Included observations: 35

Variable	Coefficien	Std. Error	t-Statistic	Prob.
	t			
C	60.19031	3.866147	15.56855	0.0000
M2	-1.51E-05	5.52E-05	-2.737660	0.0092
CAD	-0.000337	0.000115	-2.931720	0.0064
PD	1.20E-05	1.64E-05	0.728011	0.4723
G_T	3.57E-05	1.70E-05	2.097486	0.0431
MGT	-0.00194	7.09E-11	-2.732639	0.0098
R-squared	0.775810	Mean dependent var	79.17488	
Adjusted R-squared	0.738445	S.D. dependent var	8.313346	
S.E. of regression	4.251652	Akaike info criterion	5.883504	
Sum squared resid	542.2963	Schwarz criterion	6.147424	
Log likelihood	-99.90307	F-statistic	20.76297	
Durbin-Watson stat	0.884103	Prob(F-statistic)	0.000000	

A4. INTERST RATE EQUATION

Dependent Variable: R

Method: Least Squares

Sample: 2006:1 2014:4

Included observations: 35

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.161907	0.782406	1.485219	0.0148
M2	-2.70E-05	8.74E-06	-3.089160	0.0040
PD	-3.20E-07	1.06E-07	-3.023295	0.0050
G_T	1.43E-06	1.28E-06	1.112169	0.2782
MGT	1.56E-04	7.73E-04	2.017232	0.0523
R-squared	0.875466	Mean dependent var	7.959352	
Adjusted R-squared	0.725923	S.D. dependent var	3.286515	
S.E. of regression	3.244803	Akaike info criterion	5.320232	
Sum squared resid	326.3911	Schwarz criterion	5.540165	
Log likelihood	-90.76418	F-statistic	3.353411	
Durbin-Watson stat	0.477288	Prob(F-statistic)	0.021319	

Table A5. 2SLS ESTIMATION

Dependent Variable: SP

Method: Least Squares

Sample: 1 35

Included observations: 35

Variable	Coefficien t	Std. Error	t-Statistic	Prob.
C	4302.692	173.1541	24.84911	0.0000
INF	43.62588	14.11263	-3.091008	0.0042
ER	10.90342	5.165431	2.111444	0.0424
R	-12.30968	6.008303	-2.049221	0.0481
R-squared	0.651462	Mean dependent var	4318.210	
Adjusted R-squared	0.621192	S.D. dependent var	761.7844	
S.E. of regression	751.3734	Akaike info criterion	16.18612	
Sum squared resid	18065982	Schwarz criterion	16.36207	
Log likelihood	-287.3502	F-statistic	13.25546	
Durbin-Watson stat	0.455262	Prob(F-statistic)	0.028324	

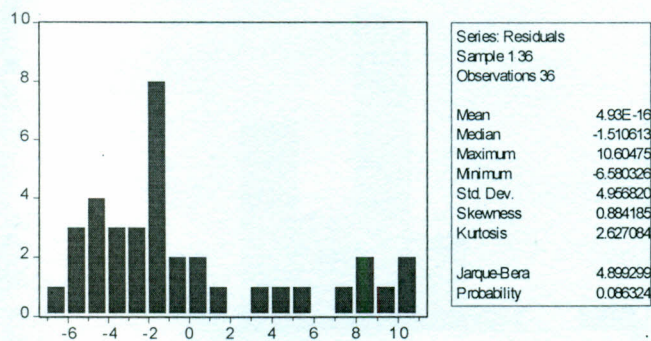
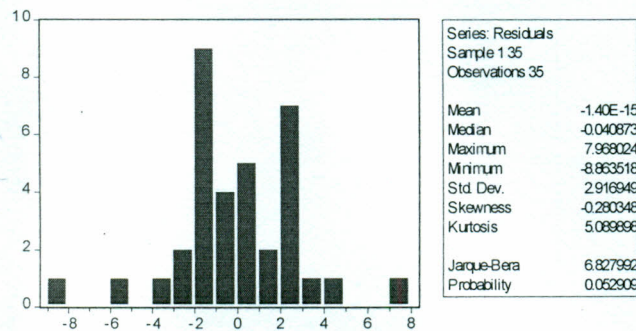
**Figure A1: Jacque-Bera test results for inflation equation**

Figure A2: Jacque-Bera test results for exchange rate equation

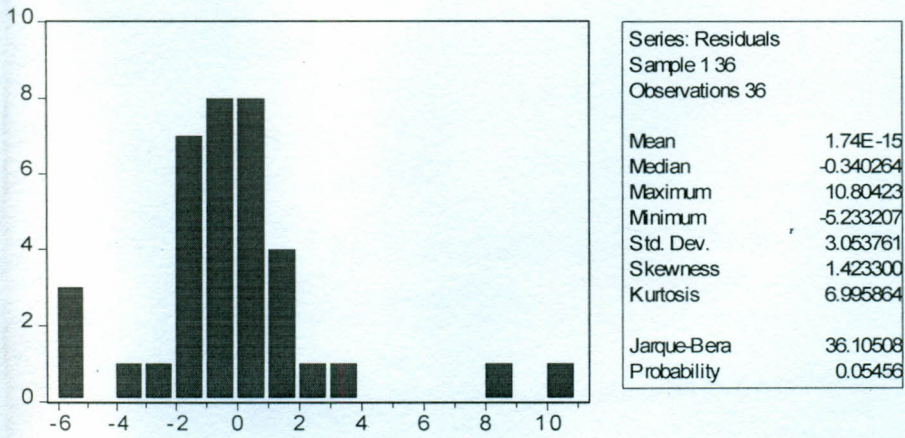


Figure A3: Jacque-Bera test results for interest rate equation

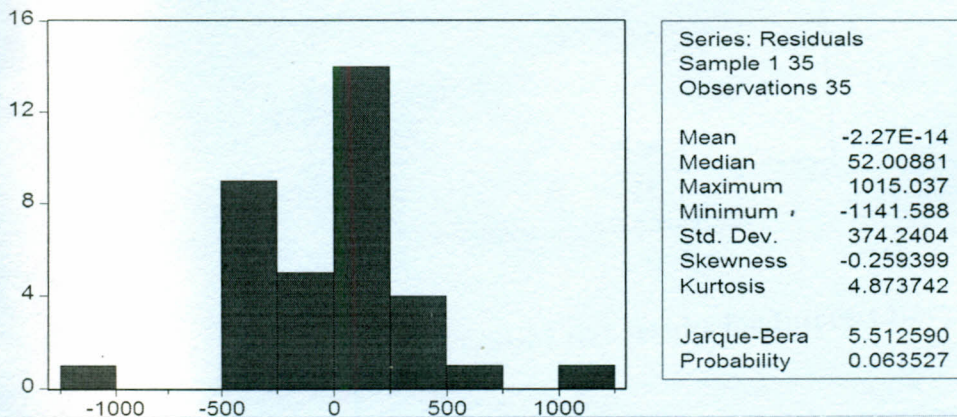


Figure A4: Jacque-Bera test results for 2SLS

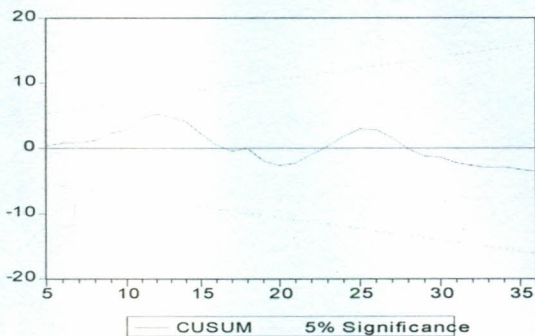


Figure A5: CUSUM Test Results for Inflation Equation

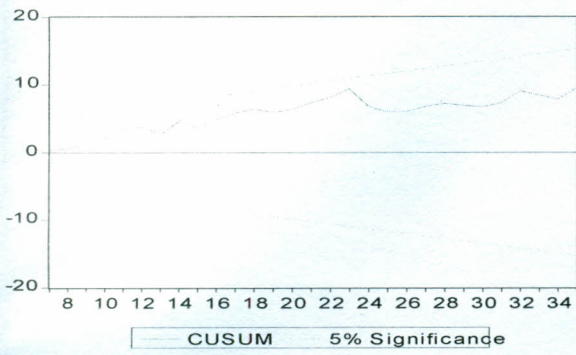


Figure A6: CUSUM Test Results for exchange rate Equation

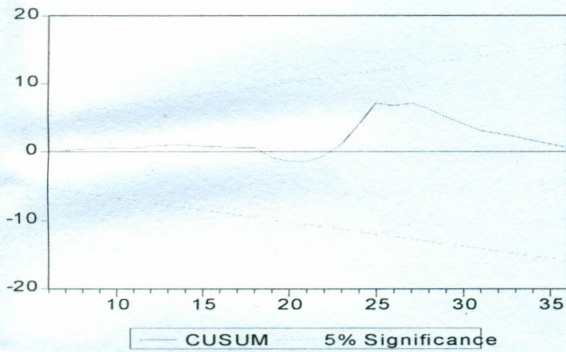


Figure A7: CUSUM test results for Interest Rate equation

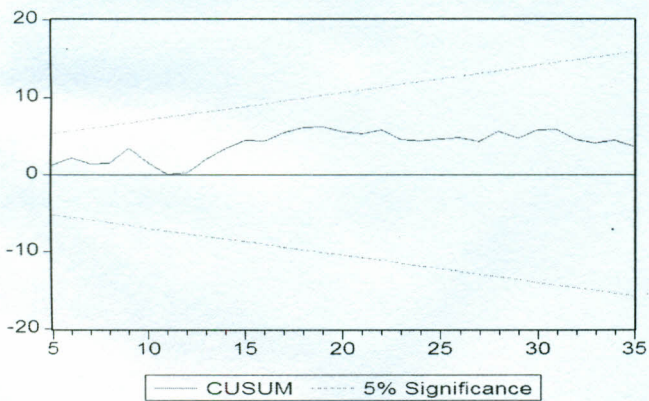


Figure A8: 2SLS CUSUM Test Results