

The Effect of Monetary Policy on Private Sector Investment in Kenya

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Abstract

The study explores the relationship between monetary policy and private sector investment in Kenya by tracing the effects of monetary policy through the transmission mechanism to explain how investment responded to changes in monetary. Several studies have offered a means to understand the manner in which monetary policy actions affect investment, prominent among them are the Classical school, Majumder (2007), the Keynesian, Barro (1997), and recently the Credit Channel Approach, Kahn (2010), Bernanke and Gertler (1995). The study utilises quarterly macroeconomic data from 1996 to 2009 and the methodology draws upon unit roots and cointegration testing using a vector error correction model to explore the dynamic relationship of short run and long run effects of the variables due to an exogenous shock. The variables are stationary in first differences and using ordinary least squares the estimated long run relationship is:

$$LRPSC = 1.84 - 0.54LRGDD + 0.62LRGDS + 0.75LRMS - 0.04LTBILL$$

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Implying that government domestic debt and Treasury bill rate are inversely related to private sector investment, while money supply and domestic savings have positive relationship with private sector investment consistent with the IS-LM model. Based on the empirical results the study suggests that tightening of monetary policy by -1 percent has the effect of reducing investment by -2.63 while the opposite loose monetary policy tends to increase investment by 2.63. The error correction term (ECT) of -0.55 is negatively signed indicating a move back to equilibrium suggesting that following an exogenous shock, 55 percent of the disequilibrium is corrected after one quarter.

JEL classification numbers: G24, O23

Keywords: Central Bank Rate, Gross Domestic Savings, Private Sector, Repurchase Rate

1 Introduction

1.1 Background to the Study

There is acknowledgement, OECD (2006), Hare and Fofie (2009) that high growth countries invest in excess of 25 percent of GDP. Investment fuelled by the private sector is recognised as the catalyst for attaining the twin goals of broad based sustainable economic development and poverty alleviation as investment allows for entrepreneurship and employment creation opportunities that increase incomes for the poor and rich alike. Investment is created through internally generated funds such as profits, retained earnings, and financing from shareholders, or externally generated finances through private placement, public offerings of shares on the stock market (IPO's). Other sources of investment include short term financial sector credit (overdrafts, trade finance, debentures, mortgages, loans), long term capital raising from the secondary markets through

corporate debt (preference shares, corporate and infrastructure bonds) and finally foreign direct investment.

According to Rama (1993) quoted in Boopen and Khadaroo (2008), the two critical factors impacting private sector investment in industrialized countries are changes in aggregate demand giving rise to the income accelerator and secondly the effect of relative prices of capital and labour and therefore profitability. However in developing countries they allege private sector investment is determined broadly by growth of GDP, (consequently money supply), the level of foreign direct investment (FDI), real exchange rates, public investment, government fiscal deficits, real interest rates and uncertainty. These instrumental factors are complemented by the levels of residual income that private citizens accrue and the liquidity obtaining in the economy. More often than not private sector investment is determined by Government economic priorities established in the short term by the government budget (monetary and fiscal policy) and executed in the long term through a development plan.

Monetary policy is one of the principal economic management tools that governments use to shape economic performance. Measured against fiscal policy, monetary policy is said to be quicker at resolving economic shocks. Discussing the impact of monetary policy on private sector investment Kahn (2010), observes that monetary policy objectives are concerned with the management of multiple monetary targets among them price stability, promotion of growth, achieving full employment, smoothing the business cycle, preventing financial crises, stabilizing long-term interest rates and the real exchange rate. That these objectives are all not consistent with each other is obvious, as the preference of monetary policy objectives is anchored upon the weights assigned by monetary authorities or country priorities. Experience shows that emphasis is usually placed on maintaining price stability or ensuring low inflation rates.

The effectiveness of monetary policy on the real economy is still an issue under intense debate particularly related to the efficacy of the transmission

mechanism. Traditionally monetary policy is seen as influencing private sector investment via three routes; namely the interest rate channel, the demand for money and the credit channel. In less developed countries Kahn (2010) avers that underdeveloped financial systems and weak interest rate responsiveness inhibit the use of the interest rate and demand for money channels due to limited applicability, while he argues that monetary policy is effective on the asset side of financial intermediary balance sheet (the credit channel view) where it tends to have greater impact. Bernanke and Gertler (1995) classify three channels of monetary policy as the balance sheet channel, the bank-lending channel and the credit channel. The balance sheet channel focuses on monetary policy effects on the liability side of the borrowers' balance sheets and income statements, including variables such as borrowers' net worth, cash flow and liquid assets whilst the bank lending channel centers on the possible effect of monetary policy actions on the supply of loans by depository institutions.

Through the control of monetary policy targets such as the price of money (interest rate - both short term and long term), the quantity of money and reserve money amongst others; monetary authorities directly and indirectly control the demand for money, money supply, or the availability of money (overall liquidity), and hence affect output and private sector investment. This view is supported by Kahn (2010) who imputes that monetary policy objectives can affect the real sector through the injection and absorption of liquidity, or by affecting the level of reserve money, or through the money multiplier, which is used to manipulate the overall stock of money. For instance the Bank of England on its website explains that aside from the bank rate another tool that may be used to achieve the same ends is to inject money directly into the economy in a process known as quantitative easing.

From the perspective of the firm, monetary policy effects on private sector can be observed through the balance sheet, the cost of capital, its effect on investment decisions and the internal rate of return aver Gaiotti and Generale

(2001). Thus monetary policy that facilitates credit to private sector investment encourages the growth of private investment whilst tight monetary policy that restricts credit to businesses discourages private sector growth.

Hare and Fofie (2009) posit that countries who only invest 5- 10 percent of their GDP are unlikely to grow very rapidly as the more successful economies of recent decades have usually achieved investment rates of at least 25 percent of GDP sometimes considerably higher. Evidence that investment is positively correlated with enabling monetary policy can be adduced from countries like India, where Mohan (2008) attributes the turning point of low growth to the current high growth, as the consistent increase in gross domestic savings. Another case in point is Bangladesh that maintained low public debt whilst financing development expenditures from tax revenues. Therefore monetary policy is a prime anchor for the growth of private sector investment in an enabling environment.

In much of Sub Saharan Africa, the structural adjustment process offered the foundation to correct structural imbalances. Mweha (1998) posits that in Kenya the prime aim of financial reforms during the 1980's was "full interest rate liberalization" which was achieved in 1991. The reforms shifted monetary policy from a purely administrative function to a market based framework. Other aspects of financial reforms included liberalization of the treasury bills market, setting up a capital markets regulator, and abolition of credit among a host of other measures. The financial reforms created a new monetary regime introducing both challenges and opportunities for private sector investment to operate in that subsequently witnessed the collapse of several private sector firms including commercial banks and non bank financial institutions due to both internal and external factors.

1.2 Statement of the Problem

Following years of declining economic growth particularly in Africa, consensus has emerged on the importance of firstly increasing total investment as well as promoting private-sector development and increasing its share of total

investment for long-term growth posits Oshikoya (1994). Additionally the 2008/09 global financial crisis brought to the fore the perils of dependence on Foreign Direct Investment (FDI) which halved in value during the last two years from US\$2.08trn in 2007 to US\$1trn in 2009 (Economic Intelligence Unit 2010). This reflected a sharp decline in the availability of credit, and exacerbated the deep recession in the developed world and emerging markets in the so-called flight to quality and a large-scale retreat from risk. Given the declining FDI, policy makers have been forced to promote efficient domestic private investment as a form of diversification from the dependence on FDI. Despite the endorsement of domestic private sector investment as a strategic asset, it is beset by policy deficiencies in monetary policy that retard the attainment of optimal investment portfolios resulting in low expectations of business in future economic performance.

Previous researches have dealt separately with monetary policy and private sector investment but not linked the two in a dynamic framework. Close predecessor studies such as Christensen (2007), focused on how various monetary and fiscal components crowd out private sector in studies using panel series data from several countries, whilst Maana *et al.*, (2008), studied the effect of government domestic debt in Kenya on private sector investment. Unlike studies that focus on one aspect of either monetary or fiscal policy effects on private sector investment, this study takes a dynamic approach to the effect of monetary policy on private sector investment. This is achieved by specifying a multivariate framework utilising vector auto regression where the dependent variable (PSI) is determined by a system of endogenous variables including lags of itself and other variables.

Based on this understanding, it is clear that there exists a gap in literature with regard to understanding the dynamics of monetary policy effects on private sector investment suggesting the need for research that will decompose and analyse facets of monetary policy supportive of private sector investment. This is

accomplished by emphasizing the effects of government domestic debt, gross domestic savings, expansionary money supply and interest rates through the exploration the short run adjustment process whilst estimating the long run relationship. Implicitly the critical question posed in the study is whether monetary policy can be held accountable for private sector investment performance or the lack of it.

1.3 Objectives of the Study

1.3.1 General Objective

To determine the effect of monetary policy on private sector investment in Kenya.

1.3.2 Specific Objectives

- i. To examine the effect of government domestic debt on private sector investment.
- ii. To establish the effect of gross domestic savings on the private sector investment.
- iii. To evaluate the effect of money supply on private sector investment.
- iv. To assess the effect of interest rates on private sector investment in Kenya.

1.4 Research Hypothesis

H₁: Gross domestic debt is negatively related to private sector investment.

H₂: Gross domestic savings are positively related with private sector investment.

H₃: Money supply positively affects private sector investment.

H₄: Interest rates are inversely related to private sector investment

2 Concepts and Theories on Private Sector Investment

Various frameworks have guided perception and understanding of interdependent processes in which the private sector investment plays a key role of economic development. Three theoretical constructs are reviewed in the literature that addresses the major issues attending the impact of monetary policy on private sector investment.

2.1 Classical Theory on Private Sector Investment

From the classical standpoint private sector investment is negatively affected by changes in monetary policy particularly government domestic debt that is viewed in competition with the private sector for scarce loanable funds available in the economy. Increases in government expenditure financed by changes in monetary policy tend to decrease the ability of the private sector investment to access funds for investment. The displacement of private sector investment by government borrowing was termed crowding out effect. Barro (1997), distinguishes the two ways in which private sector investment can be displaced as arising from a tax cut or an increase in government consumption spending. This induces increased public debt which he describes as; “the decline in private investment that may result from a tax cut financed by a government budget deficit and the decrease in private consumption and investment that results from an increase in government consumption respectively”.

In the classical frame several other factors are seen to influence the behaviour of private sector investment; such as the public debt structure, its maturity and composition of ownership. Maana *et al.*, (2008) noted that the composition of public domestic debt portfolio influences how investment in the private sector can access credit. Christensen (2005), argues that a narrow investor base consisting mainly of commercial banks increases the risk that as government securities are sold, private companies dependent mainly on commercial bank financing will lose

out in the absence of nonbank investors, such as pension funds and retirement funds, to which the government could sell its debt without necessarily displacing private sector investment.

The role of interest rates is pivotal to understanding how private sector investments are affected by monetary policy. Kutepel (2005) citing Beck, 1993: 167; Heijdra and Ligthard, 1997: 804; Voss, 2002: 642- 643; Amirkhakhali vd., 2003: 1138-1139; Ganelli, 2003: 88) submit that the neoclassical school infers that balancing of savings and investment will be solved by the interest rate mechanism. Where government spending increases are funded out of domestic debt, interest rates have to increase to bring the capital market into equilibrium, dampening private sector investment. This assertion is buttressed by the major assumption that money supply remains constant. In the event that money supply increases or is accommodative to fiscal spending then interest rates may remain constant or fall depending on the growth of money supply and therefore liquidity in the economy.

2.2 Keynesian Theory on Private Sector Investment

The Keynesians believe that governments are justified to stimulate economic growth through the use of deficit causing fiscal policy. They assume that the economy is not at full employment and that the interest rate sensitivity of investment is low. In such a situation increased government spending causes minimal increase in the interest rate whilst increasing output and income. Further they argue government expenditure increases private investment due to the positive effect of government spending on the expectations of the investors.

Their argument is based on the principle of the multiplier where a change in government spending induces a greater change in output. Barro (1997) illustrates this point by explaining that in the Keynesian model an increase in aggregate demand leads to increased output, that entails more real income, hence a further increase in aggregate demand. This change leads to another rise in output and

thence more demand. As each successive increase in output is smaller than the previous one the process is not infinite.

Furceri and Sousa (2009), posit that the standard Real Business Cycle (RBC) model claims that an increase of government consumption will have a positive effect on investment: an increase of government consumption induces a rise in employment which, if sufficiently persistent, leads to a rise in the expected return to capital and, therefore, may trigger a rise in investment. Savings are assumed to grow as only part of the income is consumed or paid as taxes.

2.3 Credit Channel Theory

Analysis of the relationship between monetary policy and output reveals that credit plays a significant role. Kahn (2010) explains that conventionally changes in short-term interest rates brought about by the central bank, through an open-market operations change the cost of capital, that then changes the rate of fixed investment, (housing expenditures, inventories). The change in aggregate demand then leads to a change in output (GDP). Citing Bernanke and Gertler (1995), Kahn (2010) posits that empirical evidence to support the conventional view of the effects of monetary policy on GDP is weak and this led to the development of the credit channel theory, whose basic premise is that market frictions create a spread between a firms' internal and external financing sources. They argue that changes in what Bernanke and Gertler (1995) call the "external finance premium" can better explain movements in investment and, therefore, overall output, than can interest rates.

According to Kahn (2010), in the context of the credit transmission channel, monetary policy affects the supply or relative pricing (the external finance premium) of loans by banks. As tighter monetary policy causes banks to lose the use of some funds which cannot be replaced with other sources of funds (such as CDs or equity), then the relative cost of funds will increase, decreasing the supply

of loans to bank-dependent borrowers who are squeezed out, due to an increase in the external finance premium. In developed financial markets generally firms have access to other sources of financing, unlike in SSA where financial markets are not as well developed and only large corporates can borrow from external markets while the smaller firms have recourse only to internally generated funding and bank borrowing. In such a market the internal rate of return has a greater impact in the investment decision making than the rate of interest.

On the basis of the three theories, the Keynesian view is considered to hold more general applicability for this study, although the credit channel theory seems to be valid for developing countries in SSA. The classical theory assumptions are difficult to apply to developing economies thereby limiting the use of the theory. The challenge is that an emerging economy like Kenya does not easily fit into the strict mould of credit rationing exhibiting elements of advanced financial system where a capital market has existed even prior to independence, government securities with the exception of 91 day Treasury bills are traded in secondary markets violating some of the crucial assumptions of the model.

In practice, private sector investment is a dynamic process that responds to the opportunities inherent in the economy in its interaction with monetary policy. Therefore there are abstractions from all the above theories that will be found to be true in specific instances. These aspects are developed in later sections to understand clearer the individual effects on the private sector investments within Kenya.

2.4 Perspectives on Private Sector Investment and Monetary Policy. Private Sector Investment and Monetary Policy

Private sector investment is a composite of factors internal and external to the firm. Since firms are at varying levels of growth some factors tend to be more

emphasised than others, depending on a firm's growth trajectory. Internal factors that influence private sector investment include: the level of profit, retained earnings and ability of the owners to inject additional capital or equity.

External factors that motivate private sector investments are the availability of credit in the market, higher stock returns, the prevailing interest rate, levels of savings in the economy and the liquidity or money supply allowed by monetary authorities. Non financial factors impinging on levels of private sector investment include the existence of competitive markets, appropriate legal and regulatory frameworks that promote efficient conflict resolution and protection of property rights, the maturity level of institutions and existing corporate governance regimes among others. In contrast factors that preclude private sector development vary from poorly defined property rights, weak collateral frameworks, legal systems that do not support effective contracting and burdensome regulation.

The existence of financial intermediary institutional weaknesses such as: ineffective screening and monitoring capabilities for loans, absence of credit rating agencies and information asymmetry on borrower's credit worthiness, coupled with non financial factors noted above provides a substantial hindrance for the growth of private sector investment. Angelelli *et al.*, (2004) aver that this environment affects the ability of financial intermediaries to offer investment finance at least cost and create incentives for financial intermediaries to opt for Government securities as opposed to private sector lending.

In Kenya, private sector investment as a proportion of GDP averaged 16.49 percent in the ten years between 1998 and 2008 while projections are that private sector investment in the coming years is expected to rise to 22.9 percent by 2012/13 and 24 percent by 2030, (Vision 2030). According to the CBK annual report of 2000 the Kenyan economy "requires an investment / GDP ratio of about 25%, sustained over time, to raise the growth rate of real GDP to about 6% per annum that is necessary to effectively address the twin problems of unemployment and poverty".

2.4.1 Relationship between Government Gross Domestic Debt and Private Sector Investment

Theoretical literature on the relationship between government domestic debt and private sector investment is both wide and diverse. Oshikoya (1994) argues that public investment and private investment are in effect two sides of the same coin. The two main views dominating the dialogue of the effect of public debt on private investment are that domestic government debt tends to displace private sector investment whereas the other view has it that public debt complements private investment.

2.4.2 Relationship between Private Sector Investment and Gross Domestic Savings

Both the theoretical and the empirical economic literature emphasize the role of domestic savings in influencing the pace of fixed investment in an economy. Theoretical frameworks emphasize the role of domestic savings in the growth of GDP through the investment channel supported by evidence from the contrast between the high growth rates recorded by East Asia Tigers and the slow growth in Latin America despite the two regions starting off with comparable levels of per capita GDP in the 1960s. Aghion *et al.*, (2009) noted that a major difference between the two regions was that the average private saving rate from 1960 to 2000 was 25% for East Asia, whereas for the Latin American countries it was only 14%.

Mwega *et al.*, (1990) avers that, in economic theory, high real interest rates have two effects on private saving that work in opposite directions. They have a substitution effect, in which saving increases as consumption is postponed to the future, and a wealth effect, in which savers increase current consumption at the expense of saving, so that the impact of real interest rates on private saving is ambiguous. Further he alleges that the McKinnon and Shaw doctrine postulates that under conditions of financial repression the substitution effect dominates the

wealth effect and that there is a portfolio effect in which an increase in real interest rates induces a shift in the composition of the wealth portfolio from non-financial to financial assets, thereby enhancing financial intermediation. The central premise of the McKinnon-Shaw (1973) hypothesis is that, an increase in the real interest rate may induce the savers to save more, which enables more investment. On the basis of the above it can be surmised that interest rates have an important role in determining domestic savings.

Aghion *et al.*, (2009) on the other hand posits that a country with international capital markets cannot grow faster by saving more as domestic saving is not an important ingredient in the growth process as long as investment can be financed by foreign saving. The existence of a secondary market in Kenya would portend that savings from international capital flows into the stock exchange may alleviate the shortfalls in domestic savings, therefore nullifying the proposition that domestic savings might be a precondition for increased investment as proposed in the Vision 2030. For instance Mwege *et al.*, (1990) did not find a positive or significant relationship between real deposit interest rates and financial savings for Kenya suggesting that safety rather than returns has been the major reason for keeping savings with financial institutions.

Indeed some have questioned the role of savings in capital accumulation and long term growth pointing out that savings in and by themselves are not a guarantee that investment shall occur or that growth will be generated explains Dobrinsky (2005) who argues that high savings will not automatically be transferred to higher growth rate. He avers that the extent to which the level of savings can affect capital accumulation, and hence growth, largely depends on the capacity of the economy to channel the savings into productive use. It also depends on the efficiency of this process. The system of financial intermediation can affect economic performance and growth directly through the role it plays in resource allocation.

The effect of gross domestic savings on private sector investment is further

influenced by government deficits. Wray (1989) quoting Greenspan (1989), notes “if the pool of private saving is small, deficits and private investment will be in keen competition for funds, and private investment will lose”. He contends that deficits absorb savings, so unless savings rise proportionally as government deficits increase, domestic investment will be crowded out due to price or quantity constraints of finance. Wray (1989) further argues that as much of private sector investment may be funded from internally generated profits, private investment need not necessarily be dependent on domestic savings and consequently the effect of government borrowing may be minimal. A critical dimension relates to whether gross domestic savings has an effect in promoting private sector investment or if long term growth lies in other domains.

Measured in countries experiencing revitalised economic potential Mohan (2008), discussed the factors underlying India’s growth indicated that among other influences, gross domestic savings increased continuously from an average of 9.6 per cent of GDP during the 1950s to almost 35 per cent of GDP currently. The review indicated that over the same period, the domestic investment rate increased continuously from 10.8 per cent in the 1950s to close to 36 per cent by 2006-07 and significantly, that the Indian economic growth was financed predominantly by domestic savings. In Kenya gross domestic savings as a percentage of GDP over the last eleven years has only once been above 10 percent (10.88% in 1999 CBK 2004 Annual report) and averaged 6.84 percent in the period 1999 to 2009 while correspondingly private sector investments averaged 16.5 percent over the same period. Mohan (2008), underscores the importance of gross domestic savings on private sector investment in a study on the Indian economy demonstrating that consistent increases in gross domestic savings are positively correlated with growth in investment. This view is echoed by the Vision 2030 that explicitly identifies accumulation of gross domestic savings as the key to unlocking the investment potential in the Kenyan economy, correlating the levels of domestic savings growth to investment growth while placing limits on foreign savings.

2.4.3 Relationship between Private Sector Investment and Money Supply

Studies on the effect of whether monetary policy impacts private sector investments through the textbook “money” channel or through the alternative “credit” channel are still contentious. In SSA Kahn (2010) avers that, the traditional monetary transmission process working through the interest-rate channel and the demand for money have been found to have limited applicability because of underdeveloped financial systems and weak interest-rate responsiveness of aggregate spending, suggesting that the credit channel, with monetary policy working through the asset side of the balance sheet of banks, apparently has greater validity for SSA.

Monetary policy contraction or expansion typically affects money supply through the monetary transmission mechanism where money supply (M2) composed of cash and quasi cash, call, savings & time deposits as well as certificates of deposits is manipulated by Central Banks. Through the use of several toolkits inclusive of central bank lending, open market operations, quantitative easing, cash reserve ratio and liquidity ratio requirements; monetary policy can effect desired changes in monetary aggregates. Where monetary policy affects deposits, it is said to influence financial intermediary’s liabilities side of the balance sheet whilst monetary policy that affects cash/ reserves works on the asset side of financial intermediary’s balance sheet in order to inject or absorb liquidity from the economy.

Kahn (2010) makes the distinction between money view and the credit view by stating that the analysis of the transmission process in monetary policy has traditionally focused on monetary aggregates whilst the credit view assesses the role of credit markets in the transmission of monetary policy. Bernanke and Blinder (1988) quoted in Kahn (2010) show that in financially undeveloped economies, the credit view offers policymakers greater insight into long-term growth. The credit view of monetary policy suggests that the tightening of monetary policy will force banks to reduce their loans and securities. To the extent

that banks reduce or reallocate their loans portfolios, spending by the recipients of bank loans would decline as borrowers become unable to substitute bank borrowing with non-bank finance due to the decline in bank credit, as is assumed in the money view.

2.4.4 Relationship between Private Sector Investment and Interest Rates

The Keynesian and Monetarists views on interest rates dominate the debate on whether changes in interest rates have an impact on investment. One school avers that it has minimal impact on investment while the other school suggests that changes in interest rates have a significant effect on investment. Smith (1996) offers another significant viewpoint when she avers that the real interest rate is the price at which the supply of and demand for capital are equated where capital is supplied via saving, and is demanded for investment.

The Keynesian school believe that interest rate is primarily a monetary phenomenon that is determined by the supply of and demand for money. Among this school, changes in interest rates have minimal impact on investment. Therefore the demand for investment funds is interest inelastic. They envision that increased money supply lowers the interest rate, stimulating investment, employment and hence gross domestic product, that leads to multiple rounds of increased spending and increased real income.

The Monetarists view is that interest rates are a function of the real economy determined by the supply and demand for loanable funds, a market which reflects actual opportunities and constraints in the investment sector. A change in the interest rates therefore causes far-reaching effects on investment. In this case the demand for investment finance is interest elastic. The monetary school see changes in money supply as stimulating new and old investment on real and financial assets, consumption goods as well as investment goods. Interest rates affect investment decisions, the critical ones in Kenya being the Central Bank Rate, Savings or deposit rate, Lending rate and the 91 day Treasury Bill Rate.

Changes in interest rates are also seen to affect the prices of assets such as bonds whilst long-term interest rates are particularly important in the mortgage sector.

2.5 Summary of Past Studies and Gaps in Literature Private Sector Investment and Monetary Policy

Literature on PSI tended to focus on the effects of panel series contrasting various aspects of monetary policy or on gross domestic product. Furceri and Sousa (2009), Christensen (2005), Easterly and Rebelo (1993) among others, have used time series data to analyse differences in growth dynamics between developing and developed countries utilising cointegration and vector autoregression models.

According to Loayza and Schmidt (2002), five main channels exist by which monetary policy is transmitted which they identify as the interest rate channel considered as the traditional manner, the asset price channel, the exchange rate channel, the credit channel and the expectations channel. Monetary policy transmission mechanisms and the varying links to investment are discussed below under the contexts that apply to each channel.

2.5.1 Private Sector Investment and Gross Domestic Debt

Christensen (2005) study of 27 African economies from 1980 to 2000, found significant evidence that crowding out of private sector investment occurs while Maana *et al.*, (2008) concluded that during the period 1996 to 2007, there was no significant evidence of crowding out of the private sector by increased domestic borrowing in Kenya. Easterly and Rebelo (1993) cited in Mitra (2006) finds a negative correlation between budget deficits and private investment in a large cross section of 125 countries that includes India. Majumder (2007) findings do not corroborate the hypothesis of crowding out in Bangladesh.

2.5.2 Private Sector Investment and Gross Domestic Savings

Abbas and Christensen (2007) in a study of domestic debt posit that compared to other forms of budgetary finance, market based domestic borrowing is seen to contribute more to macroeconomic stability, low inflation, reduced vulnerability to external real domestic monetary shocks and domestic savings generation. They argue that recent experiences by emerging countries such as China, India, and Chile, using domestic debt among other attributes have experienced faster growth while avoiding major financial or fiscal crises. The IMF (2001) cited in Abbas and Christensen (2007) suggests that availability of domestic debt offers savers an alternative to capital flight as well as lure back savings from the non-monetary sector into the formal financial system. These conditions are applicable to countries that have well developed financial systems. Mohan (2008) identifies as part of India's long-term growth the fact that savings increased continuously as did the domestic investment rate over the same time and significantly, that the Indian economic growth was financed predominantly by domestic savings.

2.5.3 Private Sector Investment and Money Supply

Bernanke and Gertler (2005) propose the credit channel as a different approach to the traditional monetarist view that emphasizes the role of money in determining asset, goods and factor prices. The credit view of monetary policy suggests that the tightening of monetary policy will force banks to reduce their loans and securities. By manipulating either the bank balance sheet or borrowers' net worth, cash flow and liquid assets the availability of credit can either be enhanced or constrained by monetary policy as Bernanke and Blinder (1988) and (1992). Similarly Kashyap and Stein, (2000) maintain that the supply of loans can be reduced through a contraction in cash reserve ratio and liquidity ratio.

2.5.4 Private Sector and Investment Interest Rates

Adamopoulos and Vazakidis (2009) contend that financial liberalization in the form of an appropriate rate of return on real cash balances is a vehicle of promoting economic growth. They argue that a low or negative real interest rate discourages saving. Reduction in savings reduces the loanable funds in an economy for investment resulting in higher interest rates, low output in turn, lowering the rate of economic growth. Thus, the "McKinnon-Shaw" model posits that a more liberalized financial system will induce an increase in saving and investment and therefore, promote economic growth.

2.6 Conceptual and Theoretical Framework

The conceptual framework brings together all the variables in understanding their interaction with the dependent variable. The framework excludes the external sector and specifies domestic aspects of the variables.

2.6.1 Private Sector Investment and Government Gross Domestic Debt

In the framework, private sector investment is affected by the amount of domestic debt borrowed by the government from the financial sector. Greater government borrowing of domestic savings reduces availability of funds for private sector investment, which implies that a negative relationship exists between private sector investment and government borrowing. Lagged private sector investment is assumed to benefit from gross domestic debt that financing public investment such as roads, railways, telecommunications, electricity and other industrialising industries raises private investment. Additionally government spending transfers funds from public into some private sector increasing output and therefore incomes.

2.6.2 Private Sector Investment and Gross Domestic Savings

Gross domestic savings provide the basis for sustained long-term private sector investment. Assuming no foreign inflows means that government savings and private sector savings determine the investment – savings nexus. The growth of gross domestic savings is assumed to be responsible for capital accumulation and indirectly the productivity of labour the real savings interest rate is further considered to be positively related to changes in gross domestic savings.

2.6.3 Private Sector Investment and Money Supply

Government borrowing supposedly reduces the amount of available domestic savings bringing upward pressure on the level of interest rates as the sale of treasury bills and bonds reduces money supply in circulation while government spending places the money back in circulation. If Government spending equates borrowing it in effect reverts to the situation prior to the sale of treasury bills and bonds albeit with a higher domestic debt. Due in part to bureaucratic processes government spending does not match the withdrawal of money supply through the purchase of securities, prompting the growth of money supply from the Central Bank to cater for money demand from the public. The framework envisages a positive relationship between private sector investment and the growth of money supply as the excess liquidity ensures that the supply of loanable funds is replenished through money supply growth.

2.6.4 Private Sector Investment and Interest Rates

Interest rate has a direct effect and negative relationship on private sector investment. When interest rates increase, private sector investment decreases because the loans will cost much more to repay therefore demand for credit by private sector falls and when interest rates fall then demand for credit rises as the cost of financing investments reduces. While interest rates are set by the market in

the case of the 91-day Treasury bill rate as the benchmark rate, the Central Bank influences the direction of the benchmark rate through the availability of liquidity in the economy.

2.6.5 Theoretical Framework, the IS – LM Model

The IS LM model offers a convenient model to analyse the effects of monetary policy while capturing the interplay of variables where private sector investment is determined by four variables, which are gross domestic debt, gross domestic savings, money supply and interest rates. The IS curve shows combinations of interest rates and levels of output where planned spending equals income. Similarly the LM schedule or money market equilibrium schedule represents combinations of interest rates and levels of income where demand for real balances is equal to the supply. Along the LM schedule the money market is in equilibrium Dornbusch *et al.* (2004). The IS curve is downwards sloping implying that a decrease in the interest rate increases the amount of investment spending resulting in increased aggregate demand and the level of output. At equilibrium, an increase in government expenditure will increase the level of aggregate demand, which raises output to meet the increased demand. The new equilibrium raises income / output from and interest rates rise because the demand for investment funds increases, so interest rates rise in response. At this point the increase in government expenditure has caused a rise in interest rates which reduces the amount of investment spending by the private sector; therefore the increase in government expenditure has crowded out private sector investment. If interest rates remain constant then government spending will lead to increased income and a new equilibrium level. While the goods market is in equilibrium, the money market is not as income has increased and the quantity of money demanded is higher resulting in excess demand. Interest rates will be forced to rise unless money supply increases correspondingly. Monetary policy is accommodative of fiscal policy in the sense that money supply increases in order

to stop interest rates from rising.

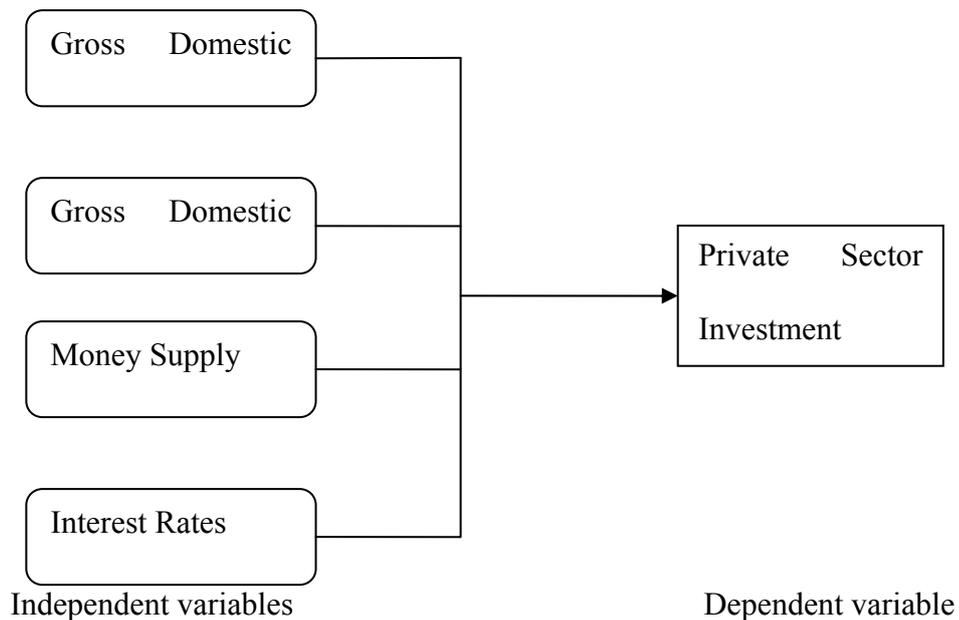


Figure 2.4: Conceptual Framework

3 Research Design

The study is conducted through a longitudinal design using quantitative techniques analysing available macroeconomic time series data.

3.1 Model specification

The study utilizes cointegration which Lee (Undated) avers is a statistical concept introduced by Granger (1983), Granger and Weiss (1983) and Engle and Granger (1987). Cointegration is a property possessed by some non-stationary time series data signifying co-movements among variables which could be exploited to test for the existence of equilibrium relationships within a fully dynamic specification framework. Two or more variables are cointegrated when a

linear combination of them is stationary, even though each variable is non-stationary.

The regression model takes the form of:

$$PSI = \beta_0 + \beta_1 GDD + \beta_2 GDS + \beta_3 MS + \beta_4 Tbill + \varepsilon_t$$

Where

Private sector investment (PSI) is the dependent variable.

Whilst the explanatory variables are:

GDD is Government Gross Domestic Debt,

GDS is Gross Domestic Savings

MS is Money Supply,

Tbill is the 91-day Treasury bill rate,

ε_t denotes the error term which is a white noise process defined as:

$$E(\varepsilon_t) = 0; E(\varepsilon_t^2) = \sigma^2; E(\varepsilon_t \varepsilon_\tau) = 0 \text{ for } t \neq \tau.$$

And $\beta_1 < 0$; $\beta_2 > 0$; $\beta_3 > 0$; $\beta_4 < 0$.

That can also be represented in log linear form as

$$LPSI = \beta_0 + \beta_1 LGDD + \beta_2 LGDS + \beta_3 LMS + \beta_4 LTbill + \varepsilon_t$$

The model takes cognisance of the fact that lagged effects contribute to the adjustment process, therefore the need to include lagged variables. The inclusion of the lagged variables in the specification allows for greater variety and dynamism in the model.

$$LPSI = \beta_0 + \beta_1 LPSI_{t-1} + \beta_2 LGDD + \beta_3 LGDD_{t-1} + \beta_4 LGDS + \beta_5 LGDS_{t-1} + \beta_6 LMS + \beta_7 LMS_{t-1} + \beta_8 LCBR + \beta_9 LCBR_{t-1} + \varepsilon_t$$

3.2 Estimation techniques

The variables are specified in a multivariate framework using a Vector Autoregressive (VAR) model that estimates both short run and long run

relationships. VAR allows for simultaneous-equation modeling as several endogenous variables are considered together, allowing for delayed responses. Each variable is 'explained' by its own lagged values, plus other endogenous variables and the lagged values of all other variables in the system. In their seminal work Engle and Granger (1987) have shown that if two series are cointegrated, then there exists an error correction model (ECM) representation of the dynamic system governing the joint behavior of the two over time. Khan and Gill (2009) aver that an Error Correction Model (ECM) is employed when unit roots are detected. The ECM is applied to find out the speed of adjustment the variables follow towards the long-run equilibrium path in response to any divergence that occurred in the short-run.

3.3 Unit roots test

Unit roots test determine the order of integration of a series being considered using the Augmented Dickey-Fuller (ADF) test. The ADF test relies on rejecting a null hypothesis of unit root (the series are non-stationary) in favor of the alternative hypotheses of stationarity.

3.4 Multivariate estimation

In the case of more than two variables, tests for cointegration use the Johansen cointegration test that involves testing the characteristic roots or eigenvalues of the π matrix (coefficients on the lagged dependent variable). The Johansen co-integration test is used to estimate the long-run impact of monetary policy on private sector investment.

3.5 Cointegration test

The interest of the cointegration test is to identify whether there exists at least one cointegrating vector. For the bivariate estimation the study utilizes the Engel Granger cointegration approach while the multivariate approach relies on the Johansen cointegration.

3.6 Error correction model (ECM)

The ECM

$$y_t = \beta_0 + \beta_1 x_t$$

$$y_t - \beta_0 - \beta_1 x_t = 0$$

$$z_t = y_t - \beta_0 - \beta_1 x_t$$

Where z_t is the ECM variable in.

$$\Delta y_t = \delta_1(L) \Delta y_{t-1} + \omega_1(L) \Delta x_t + \gamma_1 z_{t-1} + \mu_{1t}$$

The ECM variable is tested for significance of z_{t-1} : i.e. test $\gamma_1 < 0$

The ECM can thus be rewritten as

$$\Delta LPSI = \beta_0 + \Sigma \beta_1 \Delta LPSI_{t-1} + \Sigma \beta_2 \Delta LGDD_{t-1} + \Sigma \beta_3 \Delta LGDS_{t-1} + \Sigma \beta_4 \Delta LMS_{t-1} + \Sigma \beta_5 \Delta LTbill_{t-1} + \lambda Ec_{t-1} + \mu_t$$

If: Δ is the first difference operator, λ is the error correction coefficient and the remaining variables are as defined above.

3.7 Data Collection

Quarterly data was collected over a 13-year period from 1996 to 2009 from various published sources. The variables are Private Sector Credit as the dependent variable used as a proxy for Private Sector Investment, Government Gross Domestic Debt, Total Deposits to proxy Gross Domestic Savings, Money Supply (M2) and the 91-Day Treasury bill rate as the explanatory variables.

3.8 Sources of Data

Due to the nature of the study, secondary data was collected from the Central Bank of Kenya, Government of Kenya publications, Kenya Bureau of Statistics and the IMF international financial statistics.

Table 3.1: Description of time series variables used

Variable	Description
Private sector investment	Proxied by private sector credit it is the total credit to the private sector by financial intermediaries, both bank and non- bank financial intermediaries.
Government gross domestic debt	Consists of securitized debt, Treasury bills (repo, treasury bills and treasury Bonds), Government stocks, non-securitized debt, overdraft/advances and others. Public debt data collected only includes debt from domestic sources while external debt is excluded.
Gross domestic savings	Proxied by Total Demand Deposits consists of demand deposits, time and savings deposits are used to proxy Gross domestic savings.
Money supply	M2 consists of money and quasi money, while extended broad money - M3 consists of M2 and Net Foreign Assets (NFA).
Treasury bill rate	91-day treasury bill serving as the benchmark rate on which interest on other Government securities are determined through auction as a measure of interest rates.

From the CBK the principal sources were CBK Annual Reports (1996-2009), CBK Monthly Economic Review (1996–2010) and the CBK Monetary Policy

Statements (2000 – 2010), CBR, lending rate, deposit rate and 91-day Treasury bill rate. The second source was the Kenya National Bureau of Statistics responsible for the Economic Survey Reports (1996 – 2010) and Statistical Abstracts (1996–2010). These reports provided a comprehensive source for macroeconomic data, such as the Total deposits, Government domestic debt, Consumer price indices and a basis for cross checking financial data from the CBK reports. The third resource utilised was the IMF International Financial Statistics that provided macroeconomic data on Kenya over a longer timeframe allowing for triangulation of data.

3.9 Research Procedures

Data transformation allows for it to be utilised whilst avoiding certain pitfalls. By deflating the data using the appropriate GDP deflator into real terms from nominal values, inflationary issues are dealt with while converting the variables into natural logarithm form lessens the occurrence of heteroscedasticity. Hussian (2009) observes that as most macroeconomic data are non-stationary, ordinary least squares (OLS) has the possibility of spurious regression. Differencing of time series variables makes the time series non-stationary but this may result in loss of long run information in the data. In this context, co-integration and error correction modelling are utilised as they retain dynamic short run as well as long run information. If OLS estimation techniques are applied to undifferenced time series, the resulting error terms are serially correlated rendering any subsequent hypothesis tests unreliable. Cointegration technique confronts spurious regression and error correction modelling provides data on short run dynamics.

4 Presentation of Data

4.1 Stationarity Test

Khan and Gill, (2009) among others posit that macroeconomic time series is susceptible to non stationarity which causes regression results to suffer from spurious regression problem. To avert this possibility the variables are tested for stationarity. An initial step involved transforming all the variables into natural logarithm in order to lessen the probability of hetroskedasticity in the model. The univariate properties of all data series are then determined to ascertain their degree of integration using the Augmented Dickey-Fuller (ADF) test based on the null hypothesis that each variable has a unit root. The results indicate that variables lpsi, lgdd, lgds, lms and ltbill become stationary after taking the 1st difference, $I(1)$ while the residual is stationary at a lower level $I(0)$ summarized in Table 4.1 below.

Table 4.1: Summery of Unit Roots test results

Variable	Level	Lag length	ADF	Critical values		
				1%	5%	10%
LPSC	$I(0)$	2	0.60	-3.56	-2.92	-2.60
	$I(1)$	2	-6.39*	-3.57	-2.92	-2.60
LRGDD	$I(0)$	2	-0.71	-3.56	-2.92	-2.60
	$I(1)$	2	-7.19*	-3.57	-2.92	-2.60
LRGDS	$I(0)$	2	0.41	-3.56	-2.92	-2.60
	$I(1)$	2	-8.57*	-3.57	-2.92	-2.60
LRMS	$I(0)$	2	1.21	-3.56	-2.92	-2.60
	$I(1)$	2	-6.48*	-3.57	-2.92	-2.60
LRTBILL	$I(0)$	2	-2.05	-3.57	-2.92	-2.60
	$I(1)$	2	-4.43*	-3.57	-2.92	-2.60
RESID 01	$I(0)$	2	-4.18*	-3.56	-2.92	-2.60
	$I(1)$	2	-7.87	-3.57	-2.92	-2.60

* Denotes rejection of null hypothesis at 1, 5 and 10 percent level of significance.

Source: Researcher summarized from E-views 5.1 outputs.

4.2 Cointegration Test

The Johansen cointegration test allows for the estimation of long run relationship between the dependent variable *lpsi* and the independent variables *lgdd*, *lgds*, *lms* and *ltbill*. The trace test indicated 3 cointegrating equation at the 0.05 level while the max – eigenvalue indicated 2 cointegrating equations at the 0.05 level. Cointegration implies that a long run relationship exists between two or more variables which move closely together. Table 4.2 below indicates the normalised cointegration equation.

Table 4.2: Normalized cointegrating equations

1 Cointegrating Equation(s): Log likelihood 479.4727					
Normalized cointegrating coefficients (standard error in parentheses)					
LRPSC	LRGDD	LRGDS	LRMS	LTBILL	C
1.000000	0.541362	-0.614769	-0.750115	0.035407	-1.837062
	(0.08362)	(0.11873)	(0.13419)	(0.01455)	(0.61740)
Adjustment coefficients (standard error in parentheses)					
D(LRPSC)	-0.373496				
	(0.21152)				
D(LRGDD)	0.963967				
	(0.32741)				
D(LRGDS)	-0.229002				
	(0.18112)				
D(LRMS)	0.446026				
	(0.18450)				
D(LTBILL)	-1.152789				
	(2.10918)				

Source: Researcher summarized from E-views 5.1 outputs.

4.3 Short run Dynamics

As cointegration is proven, an error correction framework is constructed to model dynamic response that indicates the speed of adjustment from the short-run to the long-run equilibrium state. The model represented by DLRPSC (-0.37), DLRGDD (0.96), DLRGDS (-0.23), DLMS (0.45) and DTBill (-1.15) show the variables adjust at the rate contained in the brackets.

Table 4.3: ECM correction for variables

Error Correction:	D(LRPSC)	D(LRGDD)	D(LRGDS)	D(LRMS)	D(LTBILL)
CointEq1	-0.373496 (0.21152) [-1.76575]	0.963967 (0.32741) [2.94422]	-0.229002 (0.18112) [-1.26434]	0.446026 (0.18450) [2.41752]	-1.152789 (2.10918) [-0.54656]

4.4 Error Correction Term

In the short run the estimated error correction term (ECT) is -0.551516 where the error correction model is estimated as shown in Table 4.4 below:

Table 4.4: Error Correction Term

Dependent Variable: DLRPSC
Method: Least Squares
Date: 10/12/10 Time: 17:02
Sample (adjusted): 1996Q2 2009Q2
Included observations: 53 after adjustments
White Heteroskedasticity-Consistent Standard Errors & Covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLRGDD	-0.007703	0.047418	-0.162454	0.8716
DLRGDS	0.855014	0.176227	4.851773	0.0000
DLRMS	0.244858	0.150006	1.632325	0.1093
DLTBILL	0.038396	0.009074	4.231311	0.0001
RESID01(-1)	-0.551516	0.145074	-3.801632	0.0004
C	-0.002872	0.003649	-0.787191	0.4351
R-squared	0.776124	Mean dependent var		0.010143
Adjusted R-squared	0.752308	S.D. dependent var		0.045811
S.E. of regression	0.022800	Akaike info criterion		-4.617872
Sum squared resid	0.024432	Schwarz criterion		-4.394820
Log likelihood	128.3736	F-statistic		32.58755
Durbin-Watson stat	1.717799	Prob(F-statistic)		0.000000

Source: Researcher summarized from E-views 5.1 outputs.

4.5 Data Analysis

The objective of the study was to determine the impact of monetary policy on private sector investment established by the regression of $lpsi$ against $lgdd$, $lgds$, lms and $ltbill$.

4.6 Stationarity Test

The series was found to be stationary in first differences [$lpsi \sim I(1)$, $lgds \sim I(1)$, $ltbill \sim I(1)$, $lgdd \sim I(1)$ and $lms \sim I(1)$]. The existence of an equilibrium relationship between the variables integrated individually to the same degree requires that the cointegration between them is of a lower degree. The residual of

the series $\sim I(0)$ signifies that the time series is stationary in levels as the ADF t - statistic and critical values are $-4.179263 < -3.5625$. Time series variables that are $\sim I(1)$ with a residual $\sim I(0)$, implies that an equilibrium relationship exists, RSAS (2003), therefore the cointegration technique was applied to the series.

4.7 Cointegration test

The Trace statistic test and Max- Eigenvalue reject the hypothesis of no cointegration, indicating that there are 3 and 2 cointegrating equations at the 0.05 level respectively implying that there exists a long run relationship between private sector investment, government gross domestic debt, gross domestic savings, money supply and the treasury bill rate. The long-run equation was estimated as:

$$\begin{aligned} & \text{LRPSC} - 1.84 + 0.541362 \text{LRGDD} - 0.614769 \text{LRGDS} - 0.750115 \text{LRMS} + \\ & 0.035407 \text{LTBILL} \\ \text{t-value} & \quad (0.61740) \quad (0.08362) \quad (0.11873) \quad (0.13419) \\ & (0.01455) \end{aligned}$$

The study focus is on LRPSC as the dependent variable, therefore analyzing the impact of LRGDD, LRGDS, LRMS and LTBILL on private sector investment, the cointegrating vector is normalized with respect to LRPSC.

$$\text{Therefore: } \text{LRPSC} = 1.84 - 0.54 \text{LRGDD} + 0.62 \text{LRGDS} + 0.75 \text{LRMS} - 0.04 \text{LTBILL}$$

The normalized cointegrating coefficients are shown above and the signs of the variables confirm the theory in the literature that government gross domestic debt and Treasury bill rate negatively affects the growth of private sector investment over time while gross domestic savings and money supply contribute positively to the growth of private sector investment.

4.8 Short run Dynamics

The greater the co-efficient of the parameter, the higher the speed of adjustment of the model from the short-run to the long- run. The short run effects measured through the vector error correction model points towards changes in the variables as being DLRPSC (-0.37), DLRGDD (0.96), DLRGDS (-0.23), DLMS (0.45) and DTBill (-1.15). The figures in brackets are indicative of the amount of disequilibrium that is “corrected” each quarter by changes in the variables from the short run to the long run.

4.9 Error Correction Term

The model includes five variables therefore the ECM would be a simultaneous equation system of five equations, one for each variable describing the short-run adjustment of that variable towards the long-run equilibrium. The adjustment process takes a number of periods and thus each equation in the ECM will have lagged variables. Table 4.4 above proposes an error correction model that is found to be significant, t statistic of -3.801632 and probability 0.0004. The error correction term (ECT) of -0.55 (RESID01 (-1)) suggests that the model returns to equilibrium following an exogenous shock and the speed at which the disequilibrium is corrected is 55 percent one period later or after one quarter. It is negatively signed indicating a move back to equilibrium, while a positive sign would indicate a move away from equilibrium. The coefficient in absolute terms (.55) lies between 0 and 1, where 0 would suggest no adjustment and 1 indicative of full adjustment one time period later.

4.10 Interpretation of Results

4.10.1 Private Sector Investment and Government Domestic Debt

In the first section the study proposed to specifically examine the effect of government domestic debt on private sector investment; with the hypothesis that government gross domestic debt is negatively related to private sector investment.

Government gross domestic debt is found to have a negative impact on private sector investment as elaborated by theory. The coefficient of GDD is $-.54$ implying that a negative relationship exists between PSI and GDD. An increase of 1 percent in GDD results in a decline of $.54$ percent in PSI. This result implies that crowding out of the private sector investment occurs as a consequence of increased domestic debt. Therefore the hypothesis that government gross domestic debt is negatively related to private sector investment is not rejected. The short run dynamics illustrated in table 4.3 indicate that $.96$ percent of the exogenous shock (disequilibrium) is corrected every quarter.

The existence of crowding out effect or a negative relationship is consistent with other studies of Christensen (2005) and Adelegan and Radzewicz-Bak (2009) that attributed the cause in part to reliance on the banking sector as opposed to the stock markets, dependence on government securities and lack of incentive to provide credit to the private sector. According to Maana *et al.*, (2008) the percentage of domestic debt held by commercial banks increased from 38.2 percent in June 1996 to 46.2 percent in June 2007. Although the Nairobi Stock exchange accounted for a significant share of domestic debt raising through treasury bonds the secondary market was undermined by the rise of Treasury bill interest rates over the period, thus the bulk of domestic debt was funded through the banking sector reducing available credit for investment.

Maana *et al.*, (2008) regressed private sector lending on domestic debt where both variables were expressed as a percentage of broad money M3 using ordinary least squares technique, and monthly data covering the period 1996 to 2007 using OLS and the results yielded significant evidence against crowding out hypothesis

at the 5 percent level. Similarly conducting a simple regression (using quarterly data from this study) of private sector investment and government domestic debt in logs yields a positive relationship between the two variables as shown below. When the model takes into account the dynamic interactions of government domestic debt, gross domestic savings, money supply and interest rates the results are reversed.

4.10.2 Private Sector Investment and Gross Domestic Savings

The study specified a second objective of establishing the effect of gross domestic savings on the private sector investment with the hypothesis that gross domestic savings significantly increases private sector investment. The long run relationship point towards gross domestic savings being positively related to private sector investment both variables moving in the same direction where a 1 percent change in GDS causes a .62 percent change in PSI. According to Gale and Orszag (2003) the Ricardian Equivalence Hypothesis advanced by Barro (1974), posits that the impact of a deficit requires that private savings rise by the same amount so that investment remains constant. If private savings increase by less than government debt then net investment declines but the domestic capital stock remains constant ($\Delta I = 0$) so domestic output is constant. The increase in savings of .62 percent would therefore seem to offset the effect that the -.54 percent of gross domestic debt, thus net PSI does not decline due to the effects of GDD and GDS. In the short run GDS effects are shown to be -.23 that indicates a move towards equilibrium or correcting the disequilibrium caused by an exogenous shock. Monetary policy shock affecting bank deposits and thus the liability side of commercial banks' balance sheets can influence the level of gross domestic savings.

Two propositions questioning the importance of domestic savings were put forth by Aghion *et al.*, (2009) and Wray (1989). Aghion *et al.*, (2009) argues that a country with international capital markets cannot grow faster by saving more as

domestic saving is not an important ingredient in the growth process as long as investment can be financed by foreign saving. This position is seemingly refuted by the experience with foreign savings during the advent of the Asian financial crisis of 1997 and the global financial crisis 2008/9 that unmasked the highly volatile nature of international capital flows reinforcing the importance of domestic savings in the long run and the need for domestic savings to sustain domestic investment. The exclusion of the role of the capital markets in the study could be a possible cause of variation as a great portion of foreign savings are channelled through the NSE. Wray (1989) contends that as much of private sector investment may be funded from internally generated profits, private investment need not necessarily be dependent on domestic savings and consequently the effect of government borrowing may be minimal.

4.10.3 Private Sector Investment and Money Supply

The specific objective related to money supply and private sector investment was to evaluate the effect that money supply had on private sector investment. The long run relationship assessed through cointegration and error correction technique was estimated as 0.75, signifying that a 1 percent increase in money supply causes PSI to increase by .75 percent. As both variables move in the same direction this validates the hypothesis that money supply positively affects private sector investment. The temporal effects of money supply estimated at .45 percent entails a move in resolving disequilibrium in the long-term equation. The long-term effect of money supply on private sector investment displays the expected coefficient signing from theoretical literature. From the Kenyan perspective, money supply (M2) is composed of cash and quasi cash, call, savings & time deposits as well as certificates of deposits (CBK annual report 2009) held by banks and non bank financial institutions.

The Central Bank of Kenya' main instruments to achieve monetary policy objectives in regard to the use of money supply includes Open Market Operations

(OMO) with commercial banks, which refer to actions by the CBK to vary the amounts of commercial bank deposits held with the CBK in relation to statutory requirements (Monetary Policy Statement 2009). OMO have a component of repos and term auction deposits. Kahn (2010) that Bernanke and Blinder (1988) show that the credit view of monetary policy suggests that the tightening of monetary policy will force banks to reduce their loans and securities. Other direct instruments that were utilised by the CBK are the Required Reserve and the Foreign Exchange Open Market Operations. The attractiveness of OMO for the CBK relates to the ability to vary the amount of commercial bank deposits. Changes in these deposits impacts on the interest rate at which credit is provided which in turn affects the growth of deposits held with commercial banks which is the dominant component of money supply. By increasing or reducing money supply the CBK effectively influences credit and thus private sector investment dependent on bank borrowing. Over the study period money supply grew consistently above target due to externalities (CBK Annual Reports 2000- 2009), suggesting that the increase in government domestic debt was counterbalanced by the injection of money into the economy. Therefore unitary tightening of monetary policy will imply that investment will be reduced by .75 percent according to the estimated long run equation, while loosening monetary policy by 1 percent has an opposite effect of increasing investment through increasing the supply of credit held with commercial banks that will be used for investment.

4.10.4 Private Sector Investment and Interest Rates

The fourth and final objective of the study was to assess the effect of interest rates on private sector investment in Kenya with a hypothesis that interest rates are inversely related to private sector investment. The long run equation proposes a negative relationship of -.04 in the overall equation, while in the short run the speed of adjustment is suggested as -1.15, a move towards equilibrium caused by a monetary shock.

The finding of a negative relationship fits the theoretical framework outlined by monetarists. In the Monetarist vision, a change in the interest rate has a substantial effect on (aggregate) investment. In other words, the demand for investable resources is interest elastic—a judgment that reflects the Monetarists' long-run orientation. In this framework as interest rates fall (raise) the cost of funds are lowered and demand for loanable funds raises (falls).

The McKinnon-Shaw (1973) hypothesis that, an increase in the real interest rate may induce savers to save more, which enables more investment would seem to have limited applicability for the Kenyan scenario. The table below depicts annualised real interest rates during 1996 – 2008, clearly indicating that in real terms interest rates have been declining to the extent that between 2003 and 2008 real rates were only positive in 2005.

5 Summary and Conclusions

5.1 Private Sector Investment and Monetary Policy

The overall objective of the study was the determination of the effect of monetary policy on private sector investment in Kenya. The long-term relationship was estimated as

$$\text{LRPSC} = 1.84 - 0.54\text{LRGDD} + 0.62\text{LRGDS} + 0.75\text{LRMS} - 0.04\text{LTBILL}.$$

The goodness of fit R^2 is 73 percent, while the adjusted R^2 is 53 percent, suggesting that at least 53 percent of the variation in investment is explained by the regression. The estimated equation signifies that a unit shock of monetary policy has a significant and positive effect on private sector investment. The error correction term is expected negative and significant at 5 percent level of significance suggesting that private sector investment adjusts to deviations from its long-term equilibrium. The ECT is estimated as -.5515 percent. This means

that 55.15 percent of last quarter's disequilibrium is corrected by changes in private sector investment.

5.1.1 Private Sector Investment and Government Domestic Debt

Domestic borrowing creates a financial crisis in the domestic credit market due to demand for loans, which displaces private sector investment provided that excess liquidity in the economy is absent. The Central Bank of Kenya reports that most of the period from 1996 to 2009 was characterised by excess liquidity arising from the slowdown in private sector demand for bank credit, which was in turn attributed to the slowdown in economic growth.

According to Maana *et al.*, (2008), domestic debt increased rapidly from 1996 to 2007 as the Kenyan government (GoK) sought to restructure its share of domestic debt in the overall public debt framework. It increased significantly from 25.8 percent to 50.5 percent during the period. Externalities that included low inflow of cheap external funds forced the GoK to borrow from the domestic market. The composition of the debt portfolio, in particular treasury bonds that were tradable on the Nairobi Stock Exchange (NSE) had the further advantage of developing of the bond market enabling the issuance of other tradable instruments by the private sector especially corporate bonds. The objective of the study and corresponding hypothesis were to examine the effect of government domestic debt on private sector investment and that Gross domestic debt is negatively related to private sector investment respectively. Consequently the short run adjustment is presented as DLRGDD (0.96) indicating an almost complete adjustment one time period later. Obviously this is attributable to the interaction with other variables in the framework. The long-term relationship $-.54\text{GDD}$ exhibits the expected sign indicative of an inverse relation between PSI and GDD from crowding out of PSI.

5.1.2 Private Sector Investment and Gross domestic Savings

Gross domestic savings influenced positively investment dictated by the long-term finding of 0.62LRGDS. Savings is the second largest effect in the long-term equation that implies that as savings increase by a unit it increases investment by .62 percent. The short run dynamics point towards an adjustment of 23 percent every quarter towards equilibrium. The findings affirm the objective of establishing the effect of gross domestic savings on the private sector investment and confirm the hypothesis that gross domestic savings are positively related with private sector investment. Increases in GDP can in part explain savings increases. Rising deposits inspire financial intermediaries to place the funds with business firms at a price higher than the deposit rate or invest in financial assets such as treasury bill/bonds. This view is suggested by IMF (2001) cited in Abbas and Christensen (2007) that domestic debt provides an alternative investment avenue for savers and can lure back savings from the non-monetary sector into the formal financial system. Although Aghion *et al.*, (2009) avers that domestic savings cannot help a country grow faster if it has access to international capital markets; this is disputed by the Vision 2030 that deliberately intends to target domestic savings to stimulate investment growth. Additionally the experiences of the 1997 Asian financial crisis brought out the fickle nature of short term international capital and the flight to quality particularly after the structural adjustment reforms that liberalised the capital accounts allowing for unrestricted movement of short term financing.

5.1.3 Private Sector Investment and Money Supply

Money supply has the greatest effect on long-term private sector investment of .75 percent. Money supply as an increasing function of private sector investment presents an expected relationship from literature. In the short run .45 of disequilibrium is corrected every quarter by changes in investment. The estimated

short run parameters are by and large lower than the long-term elasticity, consistent with expectations. Clearly the results confirm the objective of evaluating the effect of money supply on private sector investment and the hypothesis that money supply positively affects private sector investment that were advanced in chapter one. From the long run estimation a unitary change in money supply effected through either one or a combination of central bank lending, open market operations, quantitative easing, cash reserve ratio and liquidity ratio requirements results in a .75 percent change in private sector investment. This positive relation suggests that the outcome of loose money supply is to augment investment while tightening money supply will consequently lead to diminished private sector investment. Over the 13 year period (1996 – 2009), the Kenyan economy experienced several changes. Economic growth was affected, by internal and external factors (drought, donor freeze, post elections violence, global financial crisis) slowed down considerably but showed remarkable resilience to record overall gains. Monetary aggregates rose on the back of GDP growth, as the chart below depicts monetary supply grew faster than private sector investment.

5.1.4 Private Sector Investment and Interest Rates

Regarding the fourth objective, the study sought to assess the effect of interest rates on private sector investment in Kenya, given the hypothesis that interest rates are inversely related to private sector investment. These were established through the regression where the long run estimation was found to be $-.04$. The coefficient signing affirms the negativity of the relationship consistent with theory while the value of $.04$ reflects the amount that private sector investment changes due to a unitary change in the Treasury bill rate. Interest rate effect on private sector investment was found to have the weakest effect overall in the long-term equation, a result that was mirrored in the short run by an indicated

finding of -1.15. According to Ngugi and Wambua, (2004), when the market faces an upward trend in lending rate reflecting increased demand for credit, financial intermediaries respond by increasing the deposit rate to mobilise more resources and meet the demands in the credit market. Other factors like the amount of liquidity in the financial sector intervene to moderate interest rates. It also depends on the diversity of financial asset portfolio for the depositors and the returns of other financial assets.

5.2 Policy and other Implications of the Findings

There is broad based consensus that Government domestic debt that is utilised for public infrastructural spending crowds in private investment. Recent external shocks (drought, global financial crisis) call forth expansionary fiscal policy to kick-start economic growth. Critically limits on government domestic debt should be in place because the corresponding interest payments have the capacity to divert public resources in rolling over old debt stock. It is acknowledged that increasing the mobilization of domestic resources (in particular, savings) for investment can aid economic development and sustainable economic growth. This should therefore be among the long-term policy priorities for Kenya especially if the development challenges enumerated in the Vision 2030 are to be overcome.

Theory postulates that in the long-term relationship between savings, capital formation and economic growth, higher rates of domestic savings and investment leads into a faster pace of economic growth. Economic growth induces higher rates of domestic savings and capital formation. This sets in motion a virtuous cycle of higher saving and investment rates, and higher trend growth. The challenge for policy makers is how to create a facilitative environment for the virtuous cycle to set in.

Clearly the spread between lending and savings rates are quite high in Kenya

compared to other economies of a similar standing. In order to encourage savings as the much hyped boost to investment, deposit rates need to be attractive particularly in the face of emerging options in investment portfolios. Concurrently lending rates are required to lessen to provide investment space through reduced cost of funds. The CBK can expedite these two actions by facilitating the narrowing of the spread between lending and deposit rates.

5.3 Suggestions for Further Studies

The study offered a macroeconomic view of the effects of monetary policy on private sector investment and like other such studies is quite broad as well as aggregative in nature. Decomposing the effects of money supply and interest rates would provide greater insight on how for instance specific interest rates such as mortgage rates impact investment in housing or home loans due to monetary shocks. Empirical examination of these facets would assist policy makers detailed understanding of the positive and negative consequences of financial sector policy that would help create an environment facilitative to the investment market.

Another area of investigation proposed is the efficacy of domestic savings particularly with regard to the important role that gross domestic savings have been assigned in the Vision 2030. As the prime motivator for private investment, savings have an important but oft overlooked position. An critical inquiry would relate to the responsiveness of gross savings to interest rates which Mweya argues are not responsive but that savers merely use for convenience.

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