RELATIONSHIP BETWEEN GROWTH IN BANK LENDING AND INFLATION IN KENYA 2000-2010

BY

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DECLARATION

This research paper is my original work and has not been submitted for award of a degree at the University of Nairobi or any other University

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LECTURER **DATE**

DEDICATION

This work is dedicated to my dear parents and family .

ACKNOWLEDGEMENTS

This paper marks the successful completion of long and tedious journey of attaining a post graduate qualification in economics. This journey was made bearable and exciting by the presence of valuable colleagues, friends and classmates at the school of economics

In particular I thank all my discussion group members, and all those who had to bear long working hours in the economics lab looking for supporting evidence of classroom presentations

Am particularly grateful to my supervisors Dr Samantha and Mr Ochoro for their valuable support and guidance .

Ultimately am grateful to God for carrying me on this journey

Table of Contents

ABSTRACT

This paper seeks to investigate the relationship between the growth of bank lending and inflation rate in Kenya for the period 2000- 2010. The investigation primarily relies on Central bank data for this period. The research is founded on neo-monetarist theory of money supply. The neo monetarist while accepting the fact that money supply is exogeously determined , also acknowledge that commercial banks create moneythrough the lending process .

For the purpose of this research, month on month growth in lending book of all commercial banks in Kenya between 2000 and 2010,the lending rate and M3 were the independent variables while inflation rate was the dependent variable. The data was analysed through the OLS . Three of the four data series were found to be integrated of order 0 and only the dependent variable was found to be integrated of order 1, there was no need to test for co-integration of the series.

The research finds that a positive relationship between inflation rate and money supply exists in Kenya for the period . Further, we established that a positive relationship between inflation rate and increase in bank lending.However, the study reveals that the relationship between increase in inflation and growth in bank lending in Kenya for the period under review is not significant

CHAPTER ONE : INTRODUCTION

1.1 Background of the study

In economic literature, inflation is commonly described by a rise in the general level of prices of goods and services in an economy over a period of time. When the general price level rises, each unit of the functional currency buys fewer goods and services; consequently, inflation can also be described in terms of a decline in the real value of money or a loss of purchasing power.

There are conflicting views on causes of inflation. Keynesian and Monetarist economists hold the view that inflation is caused by an excessive growth of the money supply. Post Keynesian economists on the other hand argue that inflation has multiple sources including growth in income. The general view is that long-term inflation arises from sustained growth in money supply at a rate which exceeds the economic growth rate. In economic literature, two schools of thought that attempt to explain the causes of inflation these are the Keynesian and the Monetarist views.

Keynesian views on causes of Inflation

Keynesian economic theory advances the view that there are two major types of inflation, each with a different cause. These are:

Demand-pull inflation:

Demand pull inflation occurs when an increase in demand by consumers or producers causes a corresponding price increase.From a national perspective, the depreciation of the local currency could lead to fall in price of local goods relative to international prices. The demand for local goods could then rise in foreign markets . The high demand in international market could lead to increase in prices .

Changes in fiscal policy may also impact on consumers effective demand.Any reduction to direct or indirect taxes on consumers leads to an overall increase in disposable income. This in turn

causes an increase in aggregate demand.

Low interest rate regimes tend to increase demand for loan and credit facilities .Access to credit increases the purchasing power of consumers thereby fueling demand. This results in increase in prices .

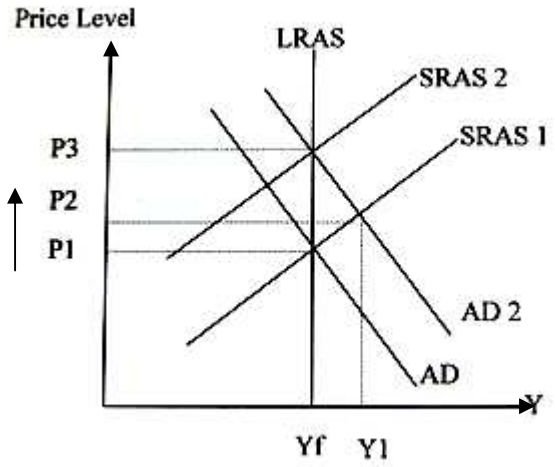
Cost-push inflation:

Inflation is said to be cost-push if it primarily arises from producers actions to raise prices of their output to maintain their profit margin following an increase in costs of some of the input factors of production. For example, the trade union push for higher wages may lead to increase in producer wage bill . The producer may wish to transfer this cost by increasing the price of the output. Increase in other production costs has a similar effects . Similary the gulf war crisis in the 1990 led to an acute world-wide oil shortage. This shortage led to a sharp increase in oil prices. In the manufacturing industry where oil is a key energy input, the producers increased their prices to cushion their profit margins from the impact of increased costs of production. Essentially, the increase in oil cost was passed to the consumers

Monetarist view on causes of Inflation

Monetarists believe the most significant factor influencing inflation is the management of money supply through the easing or tightening of credit. They consider fiscal policy, or government spending and taxation, as ineffective in controlling inflation. Monetarists use the aggregate supply and aggregate demand framework to explain inflation. The initial point in this framework , output is at the natural rate , any increase in money supply shifts demand curve to the right . This causes output to increase above the natural rate , causing aggregate supply to shift quickly to the left . This process will continue until the economy returns to the natural rate of output to achieve a new equilibruim. At this new equilibrium, the price level has increased.The monetarist view is that the sole cause of price change is shift in aggreage demand that is a result of increase in money supply

Monetarist views on cause of inflation are shown in the diagram below



Source: Macro economics Theory and Practice ;William Branson

Where

P1, is the initial price

P2 is the price in the short run after the increase in money supply

P3 is the price in the long run

SRAS is the aggregate supply curve in the initial period

SRAS is the aggregate supply curve after the increase in money supply

LRAS is the aggregate supply curve in the long run

AD is the aggregate demand in the initial period

AD2 is the aggregate demand after the increase in money supply

Explaining the cause of inflation from a monetarist

In the above diagram an increase in the money supply causes a rise in aggreage demand , AD to AD2. In the shortrun this may cause a rise in actual output, Y as workers receive higher wages and work more. However this causes an increase in inflation and therefore firms costs increase

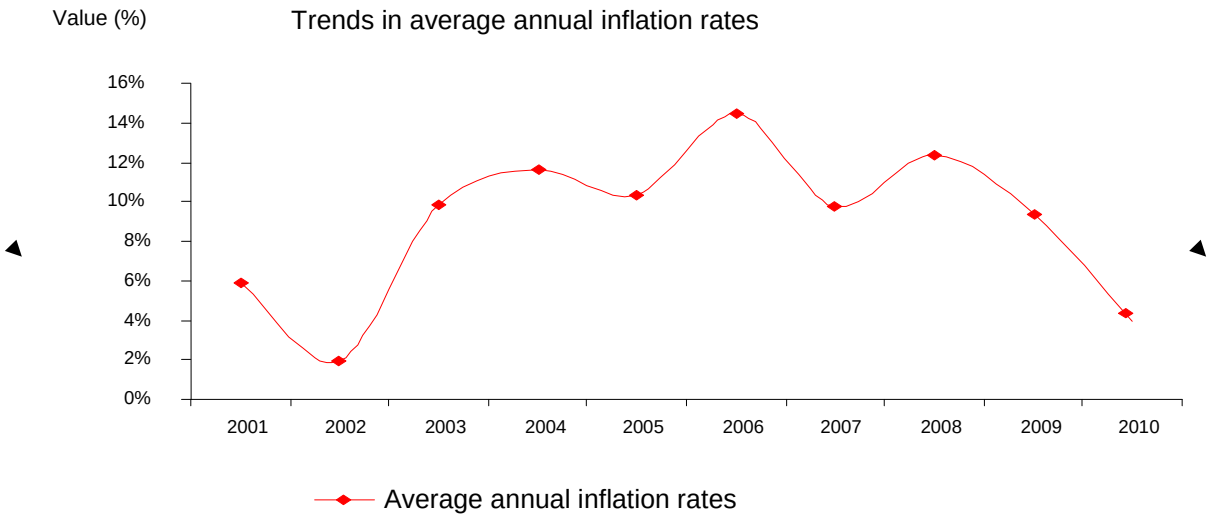
therefore the SRAS shifts to the left causing output to return to YF and the price level increases to P3.

1.2 Inflation in Kenya

Inflation trends in Kenya are measured movements in the Consumer Price Index. The Index measures price levels of a basket of goods. Food and fuel price movements account for 32% of index movement. Other items in the basket include cost of air-time, cellular phone,transport , parking fees among other items.

The Consumer price index is a measure of the weighted aggregate change in the retail prices paid by the consumer for given goods and services in a given basket. Price changes are measured by re-pricing the same basket of goods and services at regular intervals, and comparing the aggregate costs with the costs of the same basket in a selected base period price. Data for constructing the indices are collected by the Kenya National Bureau of Statistics through a survey of retail consumption goods and services. The percentage change in Consumer Price Index over a period of one year is what is often referred to as annual inflation rate. Figure 1 shows the trend in inflation rate in Kenya between 2001 and 2010.

Figure 1:Annual Inflation Rates in Kenya (2001-2010)



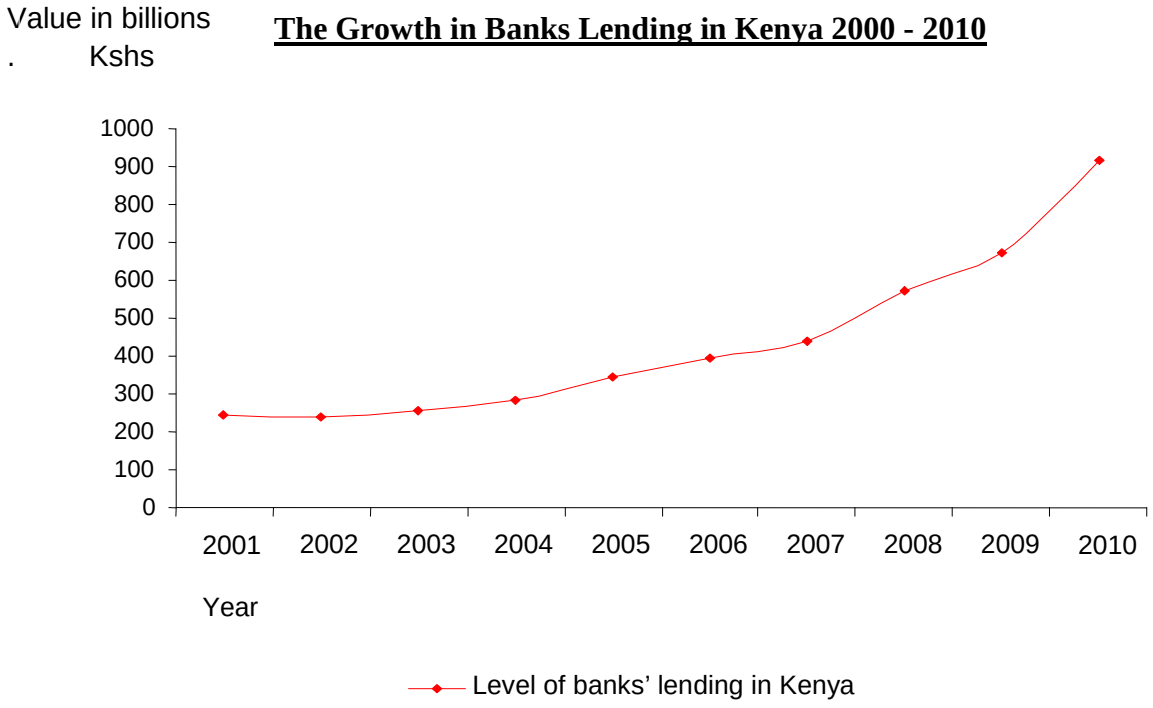
Source: Kenya National Bureau of Statistics

The inflation in Kenya has been on an upward trajectory. Monetary Policy Committee has attributed high inflation rates in the country to increased access to credit by private sector agents

from commercial banks. This fuels demand for goods and services in the economy.According to 2010 Central bank report, most of the new lending by commercial banks is targeted to households. This may have the implication of boosting capacity to consume without increasing production.

Figure 2 shows the growth in bank lending as recorded in the Banking Industry reports at the Central Bank of Kenya. The net increase in bank lending is about 750 billion . Since banks create loans by opening a deposit account that increases the cash balance available to the customer, its correct to state that the commercial banks have pumped 750billion into the economy

Figure 2: Bank Lending Rates in Kenya (2000-2010)



Source: Central Bank of Kenya (2011)

1.3 Statement of the problem

Inflation is the general increase in price level for goods and services over a period of time expressed in terms of money. Rise in inflation implies loss of purchasing power of one currency . In an environment of rising inflation, the economic agents will have to spend more to maintain the same consumption levels . This is often achieved through agiatation for higher wages by trade unions. The effect of rise in wage bill to the firm is often passed to the consumers through higher prices for the firms's output . In the long run, rise in inflation makes the goods and services of a coutry more expensive relative to those of other countries where inflation is stable. Ultimately, this impacts on trading activities as exports decline due to poor competitiveness of local products in the international markets. The consequence of this is rise in unemployment and decline in economic growth.

In Kenya, inflation has been rising over a period of time. The rise in inflation has been attributed to several causes . This paper seeks to understans the extent to which inflation can be attributed to growth in lending by commercial banks . This will help the monetary authorities to reign in on inflation leading to improvement in economic growth.

1.4 Research Questions

To the best of our knowledge no known empirical studies have been undertaken in Kenya on the relationship between growth in commercial bank lending and Inflation. Policy actions on curbing inflation have sometimes been directed at curtailing growth on loan and advances without empirical evidence that the desired results will be achieved. Increase in bank lending in Kenya over a period of time seems to go hand-in-hand with increase in inflation. The nature of the relationship is however , to the best of our knowledge, not documented empirically. This study will help us answer the following questions

(a) Is growth in bank lending a strong predictor of inflation trends in Kenya?

(b) Does access to credit in Kenya lead to a sustained upward pressure on prices?

1.5 Objective of the study

The primary objective of the study is:

To establish empirically if any relationship exists between the growth in commercial bank loans and the inflation rates in Kenya based on 10 year data drawn between 2000 and 2010

The secondary objective of the study is to establish the extent to which rate of inflation in Kenya is influenced by the growth in commercial bank lending

1.6 Hypothesis

H_O: The relationship between the growth in commercial banks lending and inflation rates in Kenya for the period 2000 – 2010 is significant

H_1: The relationship between the growth in commercial bank lending and inflation rates in Kenya for the period 2000 – 2010 is not significant

1.7 Importance of study

The study will be important to the following parties:

(a) Industry regulators

These include the central monetary authorities, primarily the Central Bank and the Treasury. From report findings the industry regulators will have a better understanding of the effects of the impact of commercial banks activities on inflation. From the results of this study, the Central Bank may adopt a suitable approach to management of money supply

(b) Commercial banks

A moderate level of inflation is often seen to have some desired economic growth impact on an economy. However, beyond certain levels inflation might slow down the economic growth. The banking industry will thrive where economic growth is abounds.

It is in the interest of commercial banks to ensure that inflation rates are moderate so as to stimulate economic growth, but not too high as to reverse the gains of the said growth. From this study, the banks will be able to estimate the desired inflation levels as well as understand the consequences of an aggressive growth in lending activities

(c) Investors

Investors will be concerned about the return of their investments. In an environment of low inflation growth, the return on investment will be high. A positive relationship between growth in commercial bank lending and inflation rates will set a warning trigger for investors. Since high inflation rates are likely to erode returns on investments, the investors stand to benefit from the findings of this report if a positive relationship is established.

(d) Academic community

The academic community has for a long time been preoccupied with inflation as an academic discourse, its causes, effects, and how it can be measured or controlled. This report adds to the existing literature on inflation in Kenya .

CHAPTER TWO : LITERATURE REVIEW

2.1 Theoretical studies on Money and Inflation

This section discusses the views on inflation from the different schools of thought. Specific attention is paid to the classical dichotomy, Milton Friedman and new monetarists. The next section reviews the economic literature on commercial bank lending and impact on inflation

2.1.2 Classical dictomy and neutrality of money

This theory preceeded John Keynes . It was supported by classical economists such as Alfred Marshal, Pigou and David Hume. At the core of this theory is a segregation of all economic varibales into norminal and real variables. Norminal vriables are expressed in terms of money while Real variables are expressed in terms of physical units such as quatities and relative prces .They then proceeded to analyze the two sets of variables separately .These writers assume that the real part of a general equilibrium system determines the relative prices of commodities and then an equation of the form MV = PQ determines the absolute price level; Where M is stock of Money, V is velocity or number of times one unit of currency changes hands in an economy, P is general price level and Q is the output.

Classical economists supportimg the dicothomy theory argues that in the short run velocity of money changes very slowly if at all. This is because they recognized technology as the main factor influencing money velocity . In the shortrun, the classical economists observed, technological changes as an input in factors of production is fixed. Consequently, the propoents of classical dichotomy assumed that velocity of money supply is constant in the short run.

Changes on the real variables are influenced by changes in factors of production . When units of land, labour, capital or tenchnology changes, we can observe some changes in gross domestic product over time .Changes in money supply affect norminal variables only , and not the real variable. According to supporters of classical dichotomy, different factors influence changes in norminal variables and real variables . The irrelevance of monetary changes for real variables is

called the money neutrarity . The expansion of bank lending should not have any impact on price level

2.1.3 Milton Friedman : inflation is always and everywhere a monetary issue

Just like the classical economists, Milton Friedman theory on money supply and inflation is founded on the quantity theory of money . The theory basically relates money and its velocity of circulation to prices and transactions. Friedman However restated the classical quantity theory in terms of a demand for money function. His restatement explained five types of assets for holding wealth: money (M), interpreted as claims or commodity units that are generally accepted in payments of debts at a fixed nominal value; bonds (B), interpreted as claims to time streams of payments that are fixed in nominal units,equity (E), interpreted as claims to state pro-rata shares of the returns of enterprises; physical non-human goods (G); and human capital (H).

Friedman's writings (1956a, 1959a,1968) suggested that inflation was associated most closely with changes in the supply of money, and that unemployment was a response to real wage . Further, he argued that as soon as agents grasped that inflation eroded the real wage they would press for compensating rise in money wage .

Friedman,(1969), advanced a model of his monetary theory is search of the optimum quantity of money. He likened it to a Japanese garden, characterized by simplicity and unity of a complex reality. He simplified monetary theory by making further assumptions, flexible prices, Money is a fixed in terms of Monetary base, No exchange of capital goods, No borrowing or lending. In this economy, people can hold money as a medium of circulation, or as a reserve. He also assumed that people would conduct all transactions at one time, obviating the need for a circulatory function of money and even eliminating uncertainty.

To illustrate how the model evolves, we introduce some money into the economy via a helicopter, which makes a one-time drop of a $1,000. Individuals will gather money equal in proportion to what they held before, which in this case will double their cash balance. But individuals are in stable equilibrium. Had they wished to double their cash balance, they would

have done so by some adjustment in the past. Individuals would now want to spend their excess cash balance, thanks to the helicopter incident,Friedman,(1968).

When others receive their spending, they too will be in the same situation of wanting to hold less cash balance. In this way the amount of money injected into the economy by the helicopter will translate into a proportional increase in prices, given the other fixed assumptions.

The key principle from Friedman's monetary theory is that monetary policies have strong influences on the economy. This has given rise to the principle that money matters. His view was that inflation is caused by money supply. In his 1968 paper, he argued that Inflation is always and everywhere a monetary phenomenon. To control inflation he advocated for use of policy rules by monetary authorities in determining the right quantity of money required in the economy.

Friedman’s assumptions on certainty, velocity, exchange rates , absence of borrowing and lending led to criticism by new monetarists

2.1.4 Neo-Monetarist: Commercial bank lending and Inflation

In 1970, Nicholas Kaldor published an article entitled ‘ The new monetarism ‘ in the Lloyds Bank Economic Review . In this paper, Kaldor challenges the view by Friedman that changes in money precede changes in output and employment. Kaldor, identified two crucial issues in monetarism, the direction of causation and the ability of the Central Bank to control the quantity of money

He concluded that classical monetarists made assumptions that led to an ‘post hoc, ergo propter hoc’ error . This error arises when it is assumed that some event, in this case the increase in quantity of money in circulation, is the primary cause of a subsequent event , that is growth in prices, output or employment , simply because the former preceded the latter .

Kaldor also expressed doubts over the stability of velocity of circulation of money. He argued that stability in money velocity is a consequence of unstable behavior in money supply which ‘accommodates itself’ to the needs of trade, increasing in a response to a trade expansion and vice versa. Kaldor expressed doubts over whether the constant money supply growth rate advocated by Friedman was achievable .

In 1981, in his article ‘ the origin of new monetarism’ Kaldor said that money supply was infinitely elastic and may be represented in a a chart of money market by a horizontal line . This gave credence to the theory of horizontal money supply curve . The natural conclusion from this chart is that the Central bank does not have full control over the money stock

Neo-monetarist therefore relaxed the assumptions by Friedman and the classical economists, and in particular introduced the role of money markets and financial institutions in money supply

In addition, neo-monetaists challenged Friedman's assumption on the neutrality of money. In his 1956 paper that saw the restatement of quantity theory of money, Friedman had relied on a distinction between real and norminal stock of money. He had argued that price level adjusts to equate the normial stock to the real demand.

Given a stable real demand for money a continuous rise in prices will require a sustained increase in the norminal stock of money. Friedman's theory of the inflation process implies that money is neutral , but only in the long run.Initially, an increase in the stock of money increases real balances at real prices. Robert Lucas, introduced rational expectations in the money demand function.

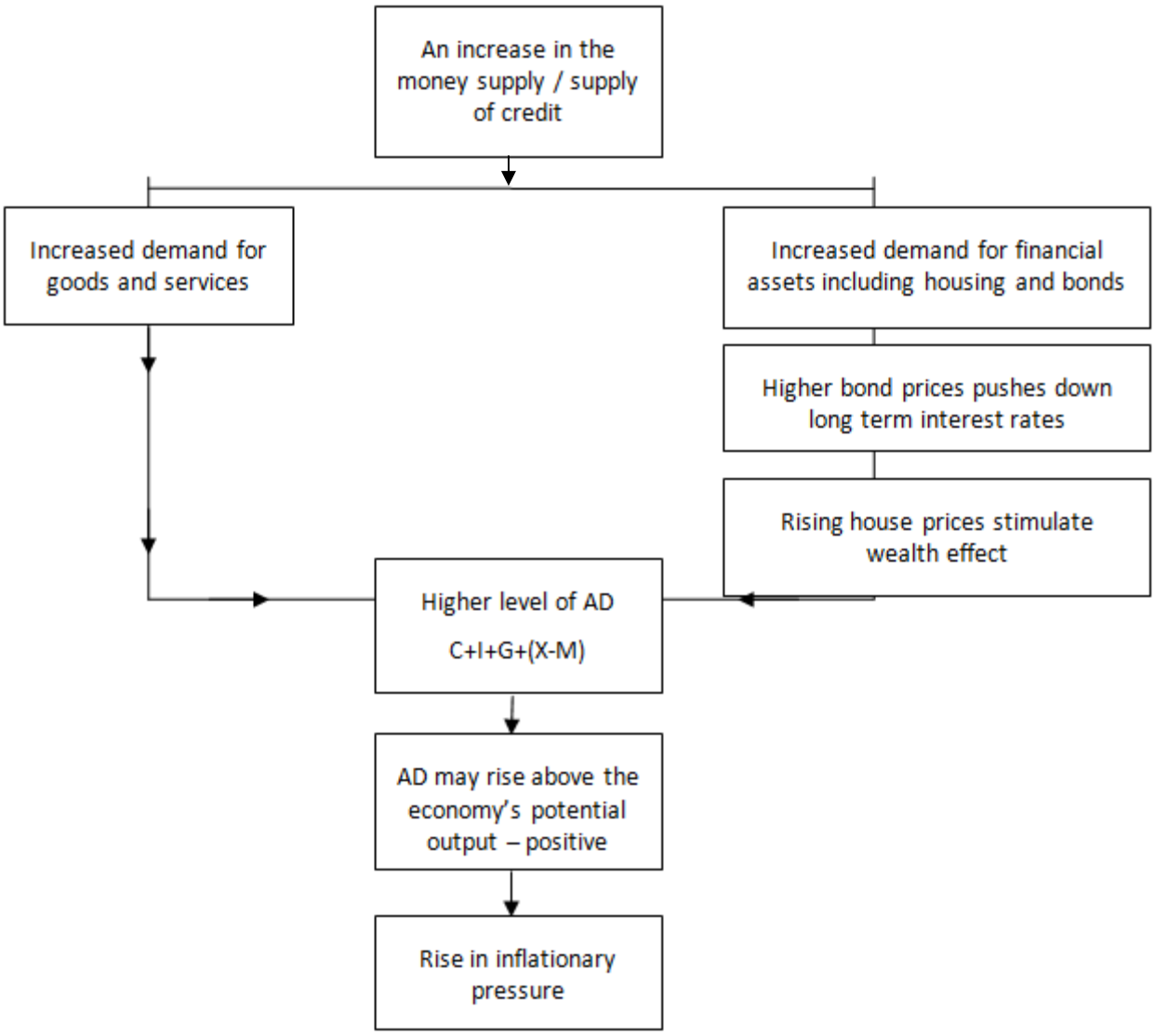
Lucas,(1995), argued that all the economic agents understand the connection between money and price level and that they correctly anticipated the systematic components of government monetary policy. Unlike Friedman, Lucas used a Walrasian model and introduced certainty and rationality . In this model, Philips curve assumptions as a basis of explaining causes of inflation do not hold. The lucas' model is an elaboration of the neoclassical growth model, whereby, in a steady state with certainity, the money stock and prices would grow at constant rates. Agents therefore anticipated increase in money supply which they presume is driven by an increased demand. Acting in anticipation of the increased demand, agents will increase the rate of investment in order to increase the rate of production to meet the increased demand

On price movements, Lucas explained that the initial effect of the increased supply of money is that prices rise faster than they otherwise would have.Once installed, however, the increased capacity resulting from the new investment retards the rate of increase in pricesbelow the steady state rate until the optimal capital stock is restored.Because of the rationality assumption, Lucas stated that economic agents do not make persistent mistakes. However, any mistake may have persistet consequences even when agents act optimally Lucas(1995)

2.1.5 Bank Credit and Money supply

Milton Friedman advanced the view that to control inflation the Government must control both the supply of money and growth of credit . Access to credit through a bank loan enables economic agents to participate in ececonomic transactions of investment and savings. The loan granted translates to a deposit. This deposit is a sub-component of M3. The loan granting process therefore contributes to increase in M3 .

.The chart below shows how credit money may impact on inflation



Source ; Money and the National Economy: L.V. Chandler

The traditional view of bank money creation process is founded on the bank reserve multiplier relationship which is expressed as follows:

M = B *m*

Where M is the monetary base,

B is the reserve base

m is the reserve multiplier

The Central Bank is able to affect the quantity of bank deposits and thereby the money stock by determining the nominal amount of the reserve base (B) or by changing the reserve multiplier *(m).* Under the Exogenous money supply theory, the Central monetary authorities have three traditional approaches to control money supply: the discount rate, open market operations and the reserve requirements; Davidson(1973).

2.1.6 Endogenous Money supply theories and bank lending

Some of the earliest thoughts on endogenous money supply are attributed to John Meynard Keynes. In his earliest works contained in his publication on *General Theory on employment, money and interest* , and *Treatise on Money*, Keynes shared the view that interest rate is the price which equilibrates the desire to hold wealth in the form of cash with the available quantity of cash. This desire formally gives the rise to thoughts on liquidity preference.
He proceeded to outline the three divisions of liquidity preference, that is,transaction motive, precautionary motive and speculative motive

In explaining these motives, Keynes came up with two liquidity functions L1 and L2. L1 mainly depends on the level of income while L2 mainly depends on the relation between current state of interest and state of expectation. This became the standard approach to money demand. Post Keynesian economists have put more emphasis on the link Keynes made between L2 function and uncertainty. The main proponents of the Post Keynesian economics include Paul Davidson, Sidney Weintraub, and Hyman Minsky.The hallmark of Post Keynesian monetary economics may be described as two-fold: The view that money matters and the idea that the supply of (bank) money is credit-driven and demand-determined

The monetarists argues that the money supply is driven by the central monetary authority. Therefore the Central monetary authority determines the stock of money available in the economy. Consequently, the key objective of the central monetary authority is to control the stock of money as opposed to controlling cost of credit, in form of interest rates.Sometimes this group is regarded to as the currency school. They believe that if the public demand for money increases, the interest rates rise. Increase in money stock by monetary authorities leads to drop in bond prices thereby returning the market to equilibrium levels. The money supply curve is therefore vertical line.

Post Keynesians on the other hand argue that the money supply curve is a horizontal line. The core responsibility of the monetary authorities is to set the cost of credit. The commercial banks, then supply as whatever credit is demanded by the public at this price. The general consensus among the post Keynesian economists is that money is the consequence of economic activities and not the cause of it.

According to Post Keynesians the amount of money in existence arises from the interactions between private sector and commercial banks on the basis of demand to hold money and the willingness to provide loans,Moore (1988). Bank money provides a more realistic approach to money in comparison to exogenous, controllable money approach. Unlike the exogenous theorists whose core principle was stock of money which was defined as a multiple of the deposits held by commercial banks, the post Keynesians focused on flow of money.Lavoie,(1984).

Davidson (1973) published a paper in the economic Journal entitled '*Money as cause and effect'*. They were responding to a quantity theory analysis of inflation. In the course of this paper, they drew attention to the endogenous nature of money creation process. They argued that money stock is elastic with respect to the needs of the trade. Marc Lavoie, (1984), advanced the thought that to understand money supply focusing on stock of money defined as M1 leads to wrong analysis. He argued that in thinking about money supply, the decisive factor is the flow of credit. What is often regarded by orthodox economists as 'stock of money' is in fact the resulting factor of expansion of credit.

Nicholas Kaldor and James Trevithick, (1981), argued that the increase in supply of money is a consequence of increased loan expenditure and not the cause of it. In so far as the expenditure is financed by making use of an existing overdraft facility or as result of a new loan arrangement, there will be an automatic increase in the money supply for the simple reason that the additional expenditure will swell the bank deposits of the recipients.

Moore (1988),published a paper entitled *Endogenous Money Supply* in the Journal of Post Keynesian Economists . In this paper, Moore argues that endogenous money supply simply denotes that the money supply is determined by market forces. He further argues that the central monetary authorities can only influence money supply by determining the level of short term interest rates exogenously. This will impact on the level of credit demanded and by extension the money supply.

Therefore the concept of endogenous money supply also seems to fit well in modern economies where the central monetary authorities have focused on setting or targeting key interest rates. In endogenous money models the causal relationship between stock of money and prices is reversed. The endogenous money plays and important role in causal relationship between investment and savings. This is simply explained by the fact that availability of loans permits the expansion of investments, which leads to an expansion of savings and by extension an increase in bank deposits.Kaldor,(1970)

Growth of credit holds implications for macroeconomic and financial issues. Quick expansion of credit stimulates aggregate demand. The process is then supported by the increase of bank lending to fuel consumption and import demands. A surge in import demand will cause deficit of the current national account. A low reserve account subsequently forces the government to tighten foreign liquidity and cut back some credit lines. It then worsens conditions of banking system and could trigger a financial or economic crisis, Wray,(1992).

2.2 Empirical studies on bank credit and inflation

Kevin Neill, (2000), studied the money supply between 1966 and 1997. In the period 1966 – 1980 the South African Reserve Bank pursued money growth target objective. . Following the implementation of market oriented monetary policy in 1980, the direct monetary growth targeting was abandoned in favor of indirect control through interest rate policy. In this study, the preliminary cointegration tests were based on the simple first step procedure proposed by Engle and Granger in 1987. The test observed a unidirectional causality from credit to M3 money supply. Moreover, Nell observed that a 1 % increase in credit resulted in a 0.21 % increase in the money multiplier. He therefore concluded that money supply in South Africa is endogenously determined over the period 1966- 1997. In addition, the rate of growth in money supply was directly influenced by the demand for credit.

Todd Keister,(2010), studied the impact of Central bank lending to commercial banks and other financial institutions during the global financial crisis.In some cases, he observed, the lending resulted in a substantial increase in monetary base. He investigated the question of general equilibrium model with overlapping generations of agents. The model shows that such lending can introduce less desirable equilibria with higher inflation rates .

Robert Lucas, (1995), studied the impact of money supply on economic cycles and growth of the economy. In his comprehensive study which yielded him the 1995 Nobel Prize he could find no significant relation between growth of the money supply and growth of the real economy. For Lucas, the only significant effect of increasing the money supply is increasing inflation, which

obviously slows down growth in the long run. So any attempt to boost growth through reducing interest rates is therefore counterproductive.

Franklin Serrano, (2002) examined the Mundell-Flemming model assumptions on supply of money. The basic Mundell-Flemming model (IS-LM balance of payments short term external capital mobility) is primarily founded on the principle that interest rates are determined by the supply and demand for money, and that money supply is exogenous.
They advanced Mundell-Flemming model allow for endogenous money creation depending on the exchange rate region adopted and interest rates prevailing in the international markets. They concluded that from an analytical point of view, the hypothesis of interest rates as determined by an exogenous supply of money is unrealistic in a closed economy.

Tulio, (1995), developed a model of the German inflation in which he explained the rise in prices, bank credit and money supply. In this model he argued that money supply is in part endegonized and expressed as a function of nominal income and deviations from potential output. Tulio goes on to explain that there is credible evidence that the German Central Bank actively financed increase in prices at a time of low economic activity in order to avert a recession thereby allowing for partial endogeneity of supply money.

Moore, (1985), investigated the short-run dynamics of loans to the private sector agents in Britain for the period 1978 to 1981. The explanatory variables in the model were components of the working capital of the firms. A single short-run disequilibrium equation was used to analysis the short-run dynamics of loans. This study also provides evidence of a positive relationship between bank credit and inflation.

Fase, (1995), studied the impact of cash flow patterns and borrowing in the Netherlands for the period 1970 to 1990.He demonstrated that for the period under study the deliberate decisions to borrow from the banks determines the demand for short-term bank credit by the private sector agents . He used a two equation structural model and the cointegration and error correction models. This study supports the shift in many countries from monetary targeting to credit

targeting with the interest rates on loan as an effective tool of credit control which may imply that this variable is a source of inflation. The study recommends a shift from monetary targeting to credit targeting with the interest rates on loan being an effective tool of credit control. Fase concludes that bank credit extension to the private sector agents is inflationary.

Calza, (2001), investigated the determinants of loans to the private sector in the Europe. The variables used in this investigation were private sector loans, GDP as a proxy for economic output, the real short-term and long-term interest rates covering the period 1980 to 1999.
The Johansen technique was used to determine the long-term relationship and Vector Error Correction Model (VECM) captured the short-term dynamics. Based on the graphical analysis Calza suggest that there is a negative relationship between bank credit and inflation. Calza noted that the surge in credit from the second half of the 1990s was accompanied by a decline in inflation. The study does not provide evidence that there is a negative relationship between credit and inflation.

Ghosh, (1999), provide evidence of a negative relationship between inflation and bank lending. He estimated the demand for bank loans in Indonesia and Korea using the real lending rates, current output, and variance of growth in output, variance of growth in output, inflation and stock market. Data used covered the period from 1991 to 1998. The switching regression model and maximum likelihood estimation model was used to determine the relationship between inflation and bank credit. Their results indicate that a unit increase in inflation lead to a fall in bank credit extension to the private sector in Indonesia and Korea.

Qayyum, (2002), estimated the demand for bank credit by the private business sector in Pakistan using three variables: the demand for bank lending by the private business sector, industrial output as proxy of output of business sector and the real rate of interest on bank advances and inflation. A three-step methodology used included a univariate analysis, multivariate co-integration analysis, and an error correction mechanism. Qayyum (2002) established a negative relationship between inflation and bank lending and concluded that policies that are able to reduce inflation are those that are geared to promote credit extension to the private sector.

Sebastian, (2005), studied the impact of credit extension by banks to the economy in Lithuania for the period 1995 to 2004. This study revealed that bank credit expansion to private sector had a positive effect on GDP growth. To investigate this, Sebastian used quarterly observations for the period. Bank lending was specified as a function of the economic output, GDP, the consumer price index, the long-term interest rate and a dummy variable which captured a structural shift. This study suggested that within the private sector, household borrowing was increasing rapidly as economic output increased. Although the household indebtedness-to-GDP ratio was insignificant, the major concern regarding this development was that credit growth exceeded income growth. This study further noted that the surge of loans to private sector agents averaged approximately 73% from 2000 to 2004. There was a rapid increase in loans denominated in foreign currencies. This tends to increase the vulnerability of a country to external shock which may trigger inflation in extreme cases. Based on the analysis for this study one can conclude that an increase in bank credit to this sector may results in a surge in inflation in the long-run.

Barbara Roffi (1995), investigated the role of excess money in inflation dynamics. They evaluated *ex post* the leading properties of money (in the broad sense of excessive monetary growth) for prices dynamics in the short run by looking at episodes of sustained monetary growth over the last three decades in 15 developed economies.

The paper further identified the characteristics that may turn an increase in money growth into a sudden rise in the inflation rate. In particular, the behavior of stock markets, housing prices as well as credit to the private sector around these episodes are assessed in order to determine whether they may help to distinguish inflationary from non-inflationary episodes of sustained monetary expansion. They concluded that over a 3-year horizon, the positive link between monetary aggregates and prices holds approximately in fifty per cent of the cases.

An econometric investigation based on probit regressions suggested that factors like contemporaneous large deviations of stock prices and housing price from trend developments and strong dynamics of access of credit from commercial banks significantly increase the probability of turning an episode of excessive money growth into an outburst of inflation.

CHAPTER THREE : METHODOLOGY

3.1. Theoretical Framework

The underpinning theoretical argument follows the Neo-monetarist theory of money supply. This theory postulates that Money supply is exogenously determined. The monetary authorities determine the supply of M1. M1 comprises of currency notes and coins held by public, demand deposits, current account balances in commercial banks, and travelers' checks. M2 and M3 include deposits. The level of deposits is influenced by deposits created by commercial banks during the loan granting process. This paper explores the relationship between the growth in loan balances and inflation trends in Kenya for the years 2000 to 2010

3.2. Data Type and Source

Four sets of data were used for the study: inflation rate, bank lending , lending rate and money supply (measured as M3). Although the focus is on the relationship between inflation and bank lending , the lending rate and money supply were included to improve the specification of the

model because inflation in a country is influenced by a myriad of factors. These data are secondary in nature and were obtained from the Central Bank of Kenya database.

3.3. Analytical Framework

3.3.1. Model specification

The study will estimate the following general model:

$$IR = f\,(PSC, LR, MS) - 1$$

Where IR (inflation rate) is the dependent variable, while the independent variables include the bank lending (PSC) and lending rate (LR) and money supply (MS) measured as M3.

Specifically, the model estimated will be in the form:

$$IR = \beta_0 + \beta_1 PSC + \beta_2 LR + \beta_3 MS + \epsilon - 2$$

Where ϵ is the error term which captures the other explanatory variables that are not included in the model.

3.3.2. Stationarity test and Co-integration test

The study will make use of time series data from the year 2000 to 2010. The use of time series data requires testing to check if the data are stationary. If the series are found to be non-stationary, their order of integration will be established. Testing for the stationarity of the data as well as the order of integration of the series will be done using the Augmented Dickey Fuller (ADF) test. Also if the series are found to be non-stationary, differencing of the series will be done to ensure that they become stationary (Gujarati, 1995).

The procedure for ADF is as follows:

$$\Delta y_t = \beta_1 + \beta_2 y_{t-1} + \sum_{i=1}^{p} d_i \Delta y_{t-i} + v_t - - - - - - - - - - - - - - - - - - 3$$

Where:

Y = variable of interest (GDP, savings, investment, government expenditure and VAT)

v_t = the white noise residual of zero mean and constant variance

Δ = an operator for first difference

P = number of optimal lags

T = time

β's and d's = parameters to be estimated

The null and alternative hypotheses to be tested by the ADF test include:

H0: $\beta_2 = 0$ (series is non-stationary / a unit root process)

H1: $\beta_2 \neq 0$ (series is stationary / no unit root)

If the t-test statistic from these tests is less than the critical value tabulated, the unit root hypothesis is rejected (Gujarati, 1995).

The study will further conduct co-integration analysis if the series are found to be non-stationary and of the same order of integration. Two series are said to be co-integrated if they are of the same order of integration but their linear combination is stationary. The Johansen's co-integration test will be used.

3.3.3. Specification test

Equally important during the data analysis test is to examine whether the model is correctly specified. The Ramsey's RESET (Regression Specification Error Test) test is used to check three types of specification errors, namely: omitted variables; incorrect functional form; and correlation between the explanatory variables and the error terms. If any of these specification errors exists, then the estimators obtained from the Least Squares regression are rendered biased and inconsistent. The Ramsey's RESET tests the following hypotheses:

$$H_0: \varepsilon \sim N\ (0, \sigma^2 I)$$

$$H_1: \varepsilon \sim N\ (\mu, \sigma^2 I) \quad \mu 0$$

The null hypothesis simply implies that there is no specification error while the alternative hypothesis implies that there is a specification error. If the probability of the F-statistic is greater

than the chosen significance level, we do not reject the null hypothesis. On the other hand, if the probability of the F-statistic is less than the significance level, we reject the null hypothesis.

CHAPTER FOUR : RESULTS AND DISCUSSION

4.1. Nature of the Data

A graphical analysis was done to examine the nature of the four series of data. The analysis is shown in appendix II.

4.2. Stationarity and Co-integration Tests

As earlier alluded to stationarity test was used to test whether the series are stationary or non-stationary at level. The results of the stationarity test (the Augmented Dickey-Fuller test) are presented in appendix III. The results show that the month-on-month growth in commercial bank lending private, month-on-month growth in money supply and lending rate series are stationary

at level, that is, they are integrated of order 0. On the other hand, the inflation rate series is non-stationary at level but becomes stationary after first differencing; hence it is integrated of order 1.

Given the findings of the stationarity test and the fact that three of the four data series were found to be integrated of order 0 and only the dependent variable was found to be integrated of order 1, there was no need to test for co-integration of the series. This is because co-integration test is used to test whether there is a long-run relationship between two or more series. However, the series must be of the same order of integration. Thus even if two/more series are non-stationary at level, their linear combination can be stationary and this would imply that the series have a long-run relationship.

4.3. Regression Results

After ensuring that all the four series were stationary and finding no need to estimate a vector error correction model, equation 2 was run using the ordinary least squares (OLS) technique. The results for the regression model are shown in appendix IV and in the table below.

Table 1: Regression results for D(Inflation Rate)

Explanatory Variable	**Parameter estimates, *t*-statistics and standard errors**		
	Coefficients	*t*- statistics	Standard error
Constant	0.707950	0.542895	1.304027
Lending Rate	-0.029194	-0.377216	0.077392
Growth in M3 Annualized	0.013360	0.809986	0.016494
Growth in Bank lending	0.000736	0.060241	0.012223
R-squared 0.005853; Adjusted R-squared -0.017631 Number of observations: 131 after adjustments F-statistic = 0.249242; Prob(F-statistic) = 0.861751			

The regression results show that:

There is a negative relationship between inflation and lending rate. That is, when lending rate increases by one unit, inflation rate reduces by 0.029 percent. This change is very negligible. The effect of lending rate on inflation rate is also statistically insignificant at 1%, 5% and even 10% significance levels.

There is a positive relationship between inflation rate and money supply. When growth in money supply increases by 1 percent, inflation rate increases by 0.013 percent. This coefficient is also statistically insignificant at 1%, 5% and even 10% significance levels.

Similarly, the study found a positive relationship between inflation rate and growth bank lending. When the growth in bank lending increases by 1 percent, inflation rate increases by 0.0007 percent. This coefficient is equally statistically insignificant at 1%, 5% and even 10% significance levels.

The three variables included in the model (lending rate and bank lending) explain only 0.59 percent of the changes in inflation in Kenya. This implies that there are other more important determinants of inflation in Kenya. Moreover, the F-statistic shows that lending rate, growth in money supply and growth in bank lending do not jointly explain changes in inflation in Kenya. This is because the probability of F-statistic (0.862) is greater than the critical value of 5% (0.005).

4.4. Specification Test

The Ramsey's RESET test results (see appendix V) reveal that the model is correctly specified (that is, we do not reject the null hypothesis that the model is correctly specified). This is because the probability of the F-statistic (0.289) is greater than the critical value of 5% (0.05) hence we do not reject the null hypothesis that there is no specification error.

CHAPTER FIVE : CONCLUSIONS

5.0 introduction

This chapter gives a summery of the findings of the research, conlussions deduced from the study and the policy implications. In addition, we give the limitations of this study and suggest areas of further reaseach

5.1 summary

In this study, we have focussed on the relationship between growth in commercial bank lending and inflation in Kenya for the period 2000 to 2010 . The research is carried out on the hypothesis that this relationship is significant over the period of study . The alternative hypothesis is that the relationship is not significant.

The theoretical foundation of the research is the Neo-monetarist theory of money supply. The theory postulates that money supply is exogenously determined by the central monetarist authorities but also recognizes the role of other institutions in the money market in the money creation process. In particular, Neo-Menetarist argues that the commercial banks are special financial intermediaries because their liabilities and assets are regarded as money. The commercial banks creates money by issuing loans. The deposits created in the loan granting process, translates into deposits in the borrower's account, which consequently becomes part of the monetary aggregates M3. We conjecture that a relationship exists between growth in M3 and commercial bank lending. Neo monetarist also embrace the Milton Friedman's proposition that Inflation is always and everywhere a monetary phenomenon. A relationship can exist between growth in money supply M3, commercial bank lending and inflation.

The research relied on secondary data from published sources, mainly the Central Bank of Kenya, National Bureau of statistics and the Government of Kenya Treasury. The primary variables used in this research include the growth in commercial bank lending, lending rate, money supply (M3) and the inflation rate. The growth in commercial bank lending, lending rate, amd M3 are the independent variables while the inflation rate is the dependent variable .

The variables were tested for stationarity using the Augumented Dicky Fuller (ADF) test. The results show that the month-on-month growth in commercial bank lending private, month-on-month growth in money supply and lending rate series are stationary at level, that is, they are integrated of order 0.

On the other hand, the inflation rate series is non-stationary at level but becomes stationary after first differencing. We therefore conclude that the data is integrated of order 1. We use OLS to analyse the data . The results show a negative relationship between inflation and lending rate. An increase in lending rate by one unit, reduces the inflation rate by 2.9 percent. In addition, a positive relationship between inflation rate and money supply was observed. A one percentage

increase in growth in money supply increases inflation by 1.3 percent. Similarly, a positive relationship between inflation rate and growth bank lending was observed. A one percentage increase in bank lending increases the inflation rate by 0.7 percent. We also conducted Ramsey's RESET to check for model specification. The resuts show that the model is correctly specified.

5.2 Conclusions

Given the OLS results, we conclude that a positive relationship exists between bank lending and inflation for the period under review. However, the relationship is not significant . One percentage increase in bank lending only explains 0.7% increase in inflation rate for the period under review. Consequently, we are unable to accept the null hypothesis.

5.3 Policy implications

The research is founded on the theoretical principle that increase in money supply is the primary cause of inflation in Kenya for the period 2000 – 2010. Commercial banks influence monetary aggregates M3 by creating deposits through the lending and multipler process. However, for the period under study, the relationship between commercial bank lending and inflation was not significant.

The policy implications of this finding are as follows

a) There are other more significant factors influencing inflation . To effectively manage trends in inflation the monetary authorities should investigate other factors

b) For the period under study, efforts by the Central bank to control inflation by curtailing growth of commercial bank lending may not have been effective

5.4 limitations of study

The study relied on secondary data published by the Central Bank for the period 2000 – 2010 . The growth in lending was inferred from net increase in commercial bank's lending portfolio over the period. The Central bank regulates only the commercial banks .

Activities of other financial institutions such as Cooperative societies, Insurance companies, micro financial institutions and the informal sector , which may have an impact on availability of credit to households and hence the inflation rate was not considered. This is because of the difficulties availability of data from these institution or their regulators

In particular, the cooperative movement and the non-deposit taking financial institutions are credit providers in their own right. These institutions operates outside the ambit of the central bank of Kenya . Their lending activities would not only impact on the growth of commercial bank liabilities but also on the velocity of money .

5.5 Suggestions for further research

The data used in this research covered the period 2000 – 2010 . The research may be extended by widening the timeframe of the study . Moreover, the Central Bank relied on the arithmetic method to compute the inflation rate over this period . This approach has since been abandoned in favour of the geometric mean .The inflation rate observed in Kenya post the change in inflation rate computation appears to be much lower than the rate observed under the previous regime . It would be interesting to carry out this research using the new methodology of computing inflation.

REFERENCES

1. Arestis, P., Howells,P., (1996) 'Theoretical reflections on Endogenous Money: The problem with Convinience Lending'. Cambridge Journal of Economics, 1996

2. Arestis, P., Sawyer,M., (2005), 'The Nature and Role of Monetary Policy when Money is Edogenous'. Levy Institute, University of Leeds, Journal of Economics, 2005

3. Atesoglu,H.,(1997), ' A Post Keynesian explanation of U.S inflation', Journal of Post Keynesian Economics, Vol 19 No 4

4. Atesoglu,H., (2000), ' Income, Unemployment, Inflation and Money in the United States', Journal of Post Keynesian Economics Vol 22, No 4

5. Bernanke, B., Gertler, M., (1989). "Agency Costs, Net Worth, and Business Fluctuations," American Economic Review 79, 14-31.

6. Bernanke, B., and Gertler, M., (1995), 'Inside the Black Box: Credit Channel of Monetary Policy Transmission'. NBER Working Paper (1995) No. 5146.

7. Bernanke, B., Gertler, M., and Gilchrist, S., (1999), The Financial Accelerator in a Quantitative Business Cycle Framework. Woodford, M. (Eds.), Handbook of Macroeconomics. North Holland

8. Borio,C.,Fuerst C and Lowe, P.,(2001), 'Procyclicality of Financial Systems and Financial Stability'. BIS Papers No.1

9. Curdia, V., Woodford, M., (2009), "Credit Frictions and Optimal Monetary Policy", mimeo, Federal Reserve Bank of New York and Columbia University.
10. Dalziel, P., (2000), 'A Post Keynesian Theory of Asset Price Inflation with Endogenous Money' Journal of Post Keynesian Economics Vol 22, No 2

11. Davidson P.,and Weintraub, S., (1973),' Money as Cause and Effect', The Economic Journal, Vol 83, No 332.

12. Driscoll, J.C. (2004), "Does bank lending affect output? Evidence from the US States", Journal of Monetary Economics 51, pp. 451-71.

13. Favara, G.,(2003), 'An Empirical Reassessment of the Relationship Between Finance and Growth.' IMF Working Paper No.3 (2003) WP/03/123.

14. Friedman, M,(1956),'The Quantity Theory of Money'; A restatement . University of Chicago Press, Chicago. 3-24

15. Friedman, M, (1959). A program for Monetary Stability'. Fordham University Press, New York

16. Friedman, M, (1968). 'Role of Monetary Policy'. American Economic Review, New York

17. Friedman, M, and Schwartz, A. J. (1963).'A Monetary History of United States 1867-1960.' Princeton University Press,Princeton

18. Friedman, M,(1969).'The optimum Quantity of Money'. Macmillan. London

19. Gilchrist, S., Yankov, V., (2009), "Credit market shocks and economic Fluctuations: Evidence from corporate bond and stock markets," Journal of Monetary Economics 56, pp.471-493

20. Hilbers, P, Otger-Robe,I., Pazarbasioglu, C., and Johnson, G.,(2005)', ' Assessing and Managing Rapid Credit Growth and the Role of Supervisor and Prudential Policies'. IMF Working Paper (2005),05/151.

21. Howell, P., (1995), ' The demand for Endogenous Money'. Journal of Post Keynesian Economics, Vol 18 No 1.

22. Kaldor, N.(1970).'The New Monetarism'. Llodys Bank Review. London

23. Kaldor, N. (1981). 'The origin of the New Monetarism' Journal of Post Keynesian economics, Vol 2

24. Keister, T. (2010).' Central Bank Lending and Inflation'Federal Reserve Bank of New York.

25. Keynes, J M (1919), Economic consequences of Peace. London, Macmillan

26. Keynes, JM (1923), A Tract on Monetary Reform . London, Macmillan

27. Keynes, J M.(1936), The General Theory of Employment, Interest and Money. London : Macmillan

28. Keynes, J M,(1971) Treatise on Money, volumes 1 and 2, Collected Works, volumes 6 and 7. London, Macmillan

29. King, R.G., and Levine, R., (1993), 'Finance and Growth: Schumpeter May Be Right.' Journal of Economics, 108: 717-37.

30. Lavoie,M.,(1984), ; 'The endogenous Flow of Credit and Post Keynesian Theory of Money' :Journal of Economic issues Vol 18 No 3

31. Levine, R., (1997), 'Financial Development and Economic Growth: Views and Agenda'. *Journal of Economic Literature*, (1997) 35: 688-726.

32. Michael H, Andrew S., (2009), ' The global credit boom: challenges for macroeconomics and policy', *Bank of England*, 2009

33. Moore B.,(1983), ' Un packing Post Keynesian Black box, Bank lending and Money Supply' *Journal of Post Keynesian Economics*, Vol 5

34. Moore,B.,(1994) ' Demise of the Keynesian Multiplier: A reply to Cottrel' *Journal of Post Keynesian Economics*, Vol 17 , No 1

35. Neil,K.,(2001), 'The Endogenous/Exogenous Nature of South Africa's Money Supply under Direct and Indirect Monetary control Measures' Journal of Post Keynesian Economics Vol 23. No 2

36. Ozgur, G., Erturk,K., (2008) ' Endogenous Money in the Age of Financial Liberalization' Unpublished Thesis University of Utah, USA

37. Pollin. R., (1993), 'Two Theories of Money Supply Endogeneity; Some Empirical Evidence'., Journal of Post Keynesian Economics, Vol 13, No 3

38. Rochon,L., (1999), 'The creation and circulation of Endogenous Money: A circuit Dynamic Approach' Journal of Economic Issues , Vol 33, No 1

39. Serrano,F.,, Summa R.,, (2000) ' Mundel Flemming without the LM curve, The exogenous interest rate in an open economy'. Journal of economics, Vol 5

40. Tulio G. (1995), Inflation and currency Depreciation in Germany, 1920 -1923 A dynamic Model of Prices and Exchange rates. Journal of Monetary Economics Vo1 2

41. Wray, R., (1992), ' Commercial Banks, The Central Bank and Endogenous Money',. *Journal of Post Keynesian Economics*, Vol 14, No 3

42. Wray R., (2000), ‘ Money and Inflation’., *Levy Economics Institute* Journal.

43. Wray ,R., (2006), ‘Keynes Approach to Money: An Assessment after 70 years.’ Levy Economics Institute

44. Wray,R.,(2007), ‘ Endogenous Money: Structuralist and Horizantalist,’ Levy *Economics Institute*, 2007

APPENDIX I: DATA ON INFLATION, BANK LENDING RATE, PRIVATE SECTOR GROWTH AND MONEY SUPPLY

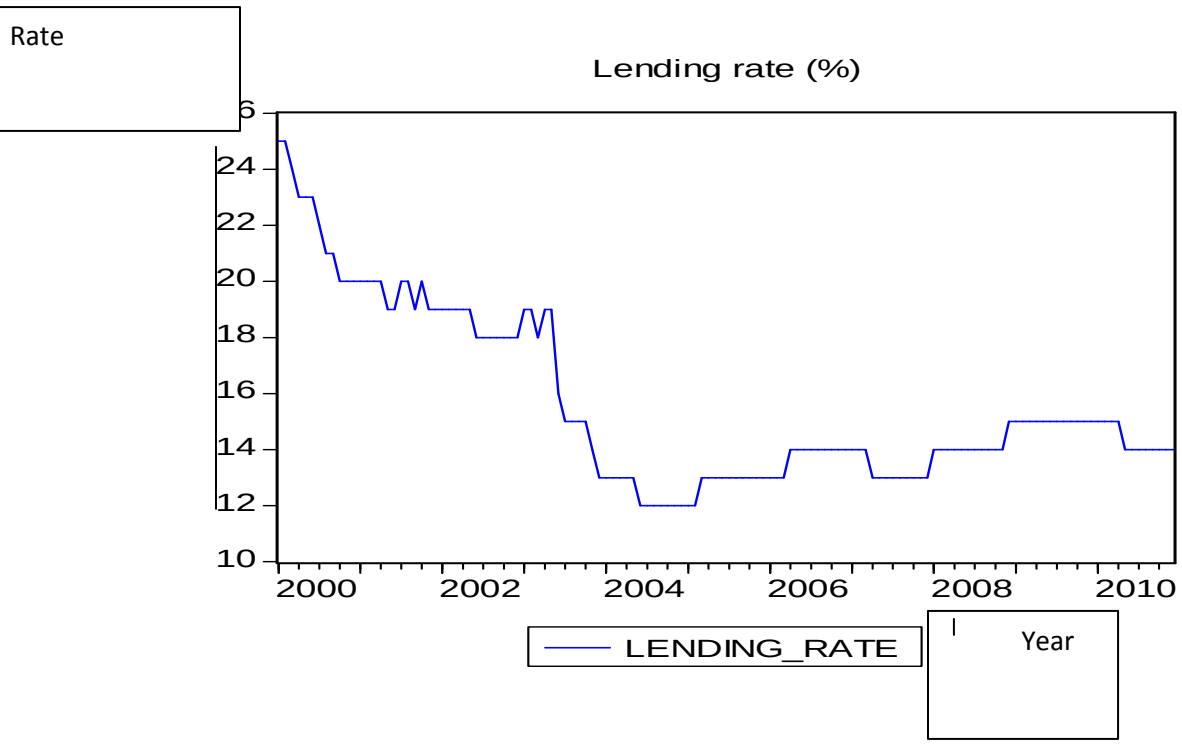
Month	***MoM growth in private sector credit annualised***	***MoM growth in M3 annualised***	***MoM inflation rate***	***Lending rate***
Jan, 2000			6%	25%
Feb, 2000	5.04%	6%	5%	25%
Mar, 2000	6.44%	-4%	4%	24%
Apr, 2000	8.32%	-30%	4%	23%
May, 2000	6.50%	20%	2%	23%
Jun, 2000	-0.04%	-3%	0%	23%
Jul, 2000	2.37%	-23%	4%	22%
Aug, 2000	2.44%	8%	4%	21%
Sep, 2000	3.63%	3%	3%	21%
Oct, 2000	20.65%	3%	3%	20%
Nov, 2000	9.04%	-19%	2%	20%
Dec, 2000	-9.54%	-13%	2%	20%
Jan, 2001	4.71%	-3%	0%	20%
Feb, 2001	4.33%	18%	1%	20%
Mar, 2001	-1.91%	-9%	2%	20%
Apr, 2001	-0.16%	-17%	1%	20%
May, 2001	14.54%	24%	2%	19%
Jun, 2001	-4.40%	5%	3%	19%
Jul, 2001	4.71%	0%	2%	20%
Aug, 2001	-70.35%	10%	2%	20%
Sep, 2001	9.78%	-21%	2%	19%
Oct, 2001	-10.98%	-15%	2%	20%
Nov, 2001	-5.36%	3%	3%	19%
Dec, 2001	-18.92%	-23%	4%	19%

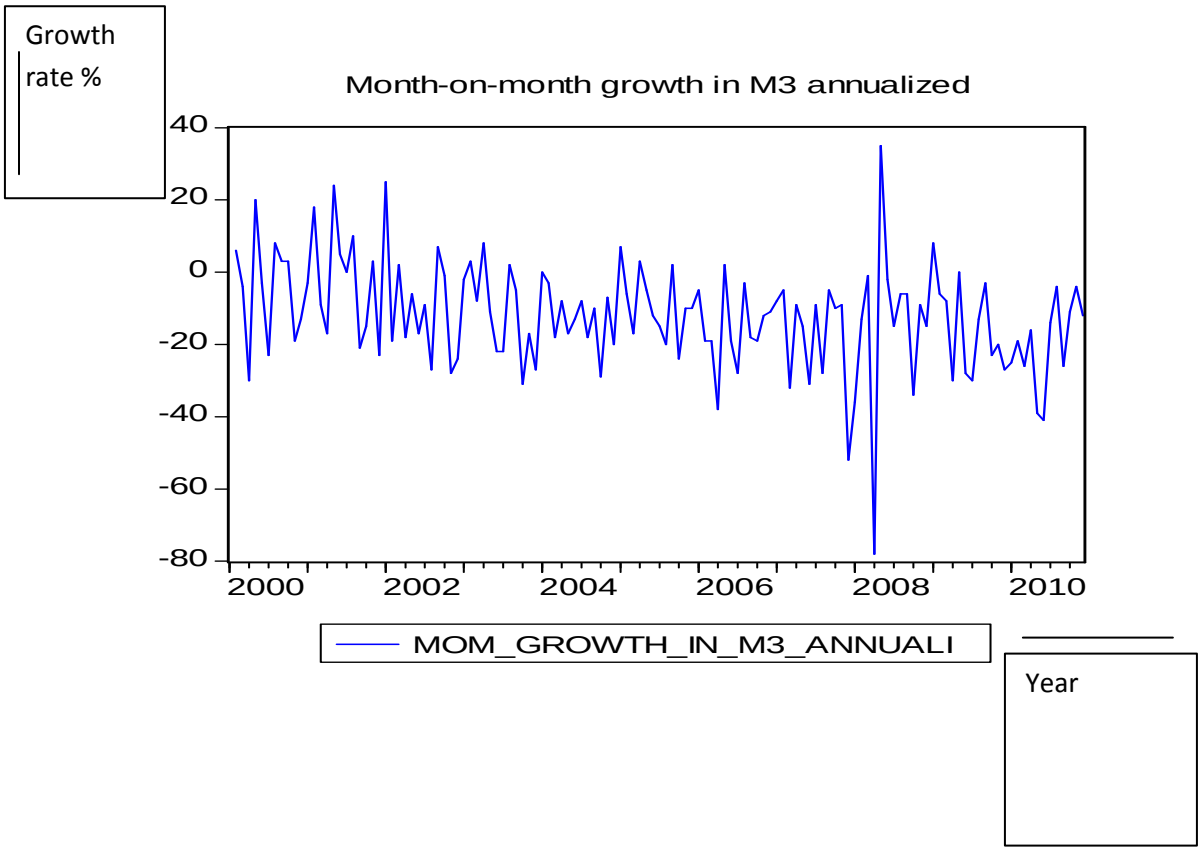
Jan, 2002	-8.21%	25%	7%	19%
Feb, 2002	7.02%	-19%	8%	19%
Mar, 2002	-5.73%	2%	10%	19%
Apr, 2002	7.26%	-18%	12%	19%
May, 2002	19.76%	-6%	15%	19%
Jun, 2002	8.03%	-17%	14%	18%
Jul, 2002	-1.44%	-9%	11%	18%
Aug, 2002	17.48%	-27%	5%	18%
Sep, 2002	4.73%	7%	8%	18%
Oct, 2002	8.27%	-1%	9%	18%
Nov, 2002	9.49%	-28%	9%	18%
Dec, 2002	6.49%	-24%	8%	18%
Jan, 2003	5.90%	-2%	9%	19%
Feb, 2003	-18.01%	3%	10%	19%
Mar, 2003	3.50%	-8%	8%	18%
Apr, 2003	-5.23%	8%	8%	19%
May, 2003	5.60%	-11%	5%	19%
Jun, 2003	8.18%	-22%	6%	16%
Jul, 2003	2.01%	-22%	8%	15%
Aug, 2003	10.96%	2%	11%	15%
Sep, 2003	7.11%	-5%	19%	15%
Oct, 2003	15.50%	-31%	18%	15%
Nov, 2003	9.91%	-17%	17%	14%
Dec, 2003	11.81%	-27%	16%	13%
Jan, 2004	30.59%	0%	15%	13%
Feb, 2004	-11.01%	-3%	14%	13%
Mar, 2004	8.45%	-18%	14%	13%
Apr, 2004	13.49%	-8%	16%	13%
May, 2004	23.35%	-17%	15%	13%
Jun, 2004	17.53%	-13%	12%	12%
Jul, 2004	16.75%	-8%	12%	12%
Aug, 2004	23.87%	-18%	8%	12%
Sep, 2004	22.04%	-10%	5%	12%
Oct, 2004	38.53%	-29%	4%	12%
Nov, 2004	10.68%	-7%	6%	12%
Dec, 2004	45.32%	-20%	8%	12%
Jan, 2005	9.51%	7%	15%	12%
Feb, 2005	5.52%	-6%	19%	12%
Mar, 2005	9.77%	-17%	19%	13%
Apr, 2005	10.74%	3%	15%	13%
May, 2005	9.44%	-5%	13%	13%
Jun, 2005	-2.90%	-12%	11%	13%
Jul, 2005	8.63%	-15%	10%	13%

Aug, 2005	4.40%	-20%	12%	13%
Sep, 2005	8.84%	2%	14%	13%
Oct, 2005	16.80%	-24%	16%	13%
Nov, 2005	17.52%	-10%	15%	13%
Dec, 2005	-4.19%	-10%	16%	13%
Jan, 2006	9.08%	-5%	10%	13%
Feb, 2006	23.07%	-19%	7%	13%
Mar, 2006	18.55%	-19%	6%	13%
Apr, 2006	24.22%	-38%	6%	14%
May, 2006	-0.58%	2%	6%	14%
June, 2006	14.92%	-19%	11%	14%
July, 2006	-17.46%	-28%	14%	14%
Aug, 2006	10.37%	-3%	12%	14%
Sep, 2006	15.00%	-18%	12%	14%
Oct, 2006	12.09%	-19%	11%	14%
Nov, 2006	10.72%	-12%	12%	14%
Dec, 2006	18.78%	-11%	12%	14%
Jan, 2007	19.05%	-8%	18%	14%
Feb, 2007	10.69%	-5%	19%	14%
Mar, 2007	21.53%	-32%	22%	14%
Apr, 2007	21.98%	-9%	27%	13%
May, 2007	25.20%	-15%	32%	13%
June, 2007	-81.96%	-31%	29%	13%
July, 2007	29.82%	-9%	27%	13%
Aug, 2007	25.27%	-28%	28%	13%
Sep, 2007	4.71%	-5%	28%	13%
Oct, 2007	11.40%	-10%	28%	13%
Nov, 2007	43.75%	-9%	29%	13%
Dec, 2007	56.35%	-52%	28%	13%
Jan, 2008	33.59%	-36%	22%	14%
Feb, 2008	0.00%	-13%	25%	14%
Mar, 2008	-7.31%	-1%	26%	14%
Apr, 2008	128.10%	-78%	26%	14%
May, 2008	-4.82%	35%	20%	14%
June, 2008	-24.33%	-2%	18%	14%
July, 2008	63.44%	-15%	18%	14%
Aug, 2008	14.44%	-6%	18%	14%
Sep, 2008	43.58%	-6%	18%	14%
Oct, 2008	33.43%	-34%	7%	14%
Nov, 2008	23.03%	-9%	5%	14%
Dec, 2008	-0.23%	-15%	5%	15%
Jan, 2009	1.55%	8%	5%	15%
Feb, 2009	21.45%	-6%	5%	15%

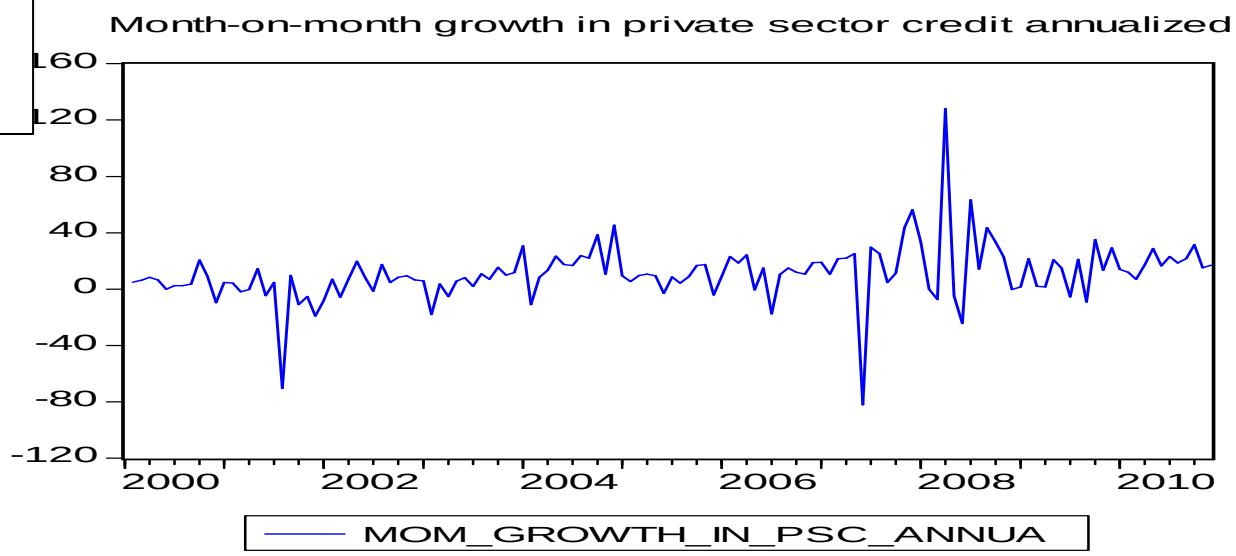
Mar, 2009	1.94%	-8%	4%	15%
Apr, 2009	1.48%	-30%	4%	15%
May, 2009	20.81%	0%	4%	15%
June, 2009	14.96%	-28%	3%	15%
July, 2009	-5.41%	-30%	4%	15%
Aug, 2009	21.24%	-13%	3%	15%
Sep, 2009	-9.03%	-3%	3%	15%
Oct, 2009	35.17%	-23%	3%	15%
Nov, 2009	13.35%	-20%	4%	15%
Dec, 2009	29.24%	-27%	5%	15%
Jan, 2010	14.12%	-25%	5%	15%
Feb, 2010	12.15%	-19%	7%	15%
Mar, 2010	7.07%	-26%	9%	15%
Apr, 2010	17.34%	-16%	12%	15%
May, 2010	28.75%	-39%	13%	14%
June, 2010	16.62%	-41%	14%	14%
July, 2010	23.22%	-14%	16%	14%
Aug, 2010	18.58%	-4%	17%	14%
Sep, 2010	21.75%	-26%	17%	14%
Oct, 2010	31.55%	-11%	19%	14%
Nov, 2010	15.10%	-4%	20%	14%
Dec, 2010	16.99%	-12%	19%	14%

APPENDIX II: GRAPHICAL ANALYSIS OF THE DATA

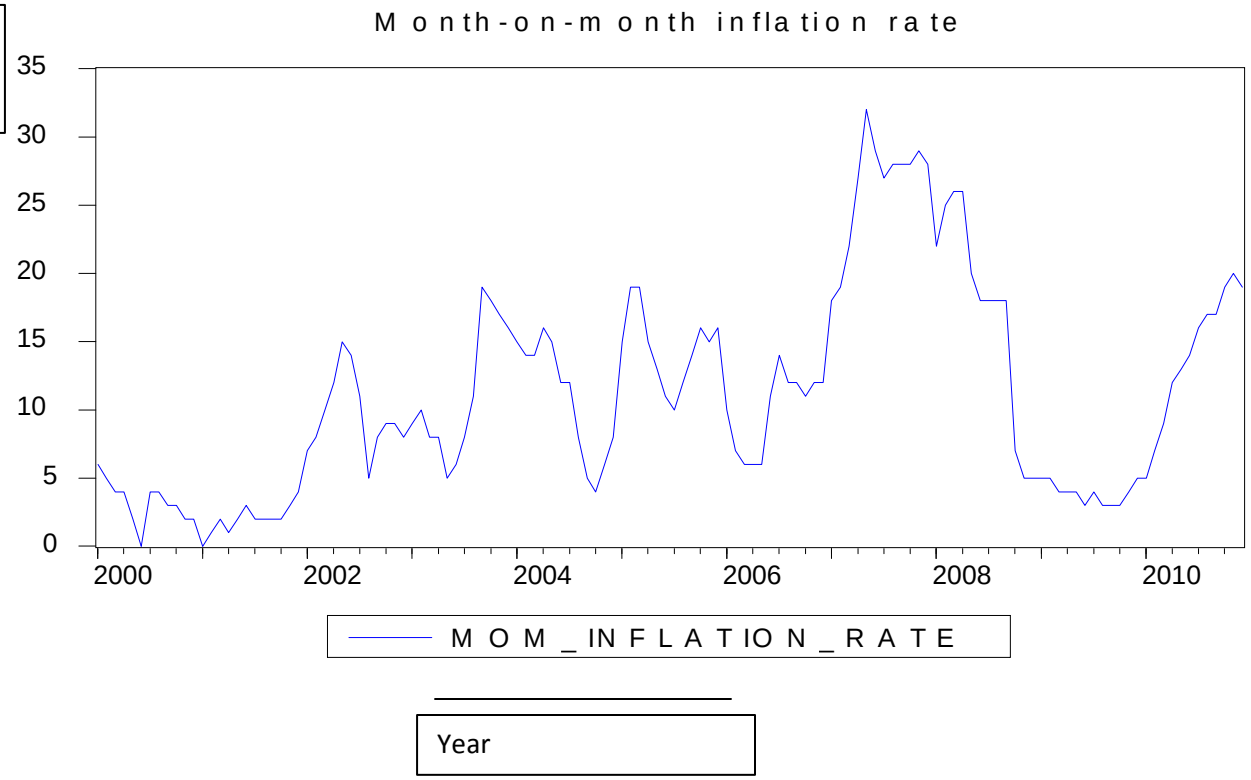



Growth rate %
Month-on-month growth in M3 annualized
40
20
0
-20
-40
-60
-80
2000
2002
2004
2006
2008
2010
MOM_GROWTH_IN_M3_ANNUALI
Year

Growth in lending Kshs Billions



Inflation rate



Year

APPENDIX III: UNIT ROOT TEST RESULTS

Lending Rate (at level)

Null Hypothesis: LENDING_RATE has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.391363	0.0130
Test critical values:	1% level	-3.480818	
	5% level	-2.883579	
	10% level	-2.578601	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LENDING_RATE)
Method: Least Squares
Date: 05/04/13 Time: 08:55
Sample (adjusted): 2000M02 2010M12
Included observations: 131 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LENDING_RATE(-1)	-0.044864	0.013229	-3.391363	0.0009
C	0.619472	0.211581	2.927828	0.0040

R-squared	0.081859	Mean dependent var	-0.083969
Adjusted R-squared	0.074742	S.D. dependent var	0.496730
S.E. of regression	0.477807	Akaike info criterion	1.375928
Sum squared resid	29.45059	Schwarz criterion	1.419824
Log likelihood	-88.12328	F-statistic	11.50134
Durbin-Watson stat	1.948164	Prob(F-statistic)	0.000924

MOM Growth in M3 Annualized (at level)

Null Hypothesis: MOM_GROWTH_IN_M3_ANNUALI has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-12.53591	0.0000
Test critical values:	1% level	-3.481217	
	5% level	-2.883753	
	10% level	-2.578694	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MOM_GROWTH_IN_M3_ANNUALI)
Method: Least Squares
Date: 05/04/13 Time: 08:58
Sample (adjusted): 2000M03 2010M12
Included observations: 130 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MOM_GROWTH_IN_M3_ANNUALI(-1)	-1.096607	0.087477	-12.53591	0.0000
C	-13.39897	1.689954	-7.928603	0.0000

R-squared	0.551112	Mean dependent var	-0.138462
Adjusted R-squared	0.547605	S.D. dependent var	22.34152
S.E. of regression	15.02697	Akaike info criterion	8.272836
Sum squared resid	28903.67	Schwarz criterion	8.316952
Log likelihood	-535.7343	F-statistic	157.1491
Durbin-Watson stat	2.005523	Prob(F-statistic)	0.000000

MOM Growth in Bank lending (at level)

Null Hypothesis: MOM_GROWTH_IN_PRIVATE_SE has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-11.45246	0.0000
Test critical values:	1% level	-3.481217	
	5% level	-2.883753	
	10% level	-2.578694	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MOM_GROWTH_IN_PRIVATE_SE)
Method: Least Squares
Date: 05/04/13 Time: 08:59
Sample (adjusted): 2000M03 2010M12
Included observations: 130 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MOM_GROWTH_IN_PRIVATE_SE(-1)	-1.012187	0.088382	-11.45246	0.0000
C	11.20550	2.054379	5.454444	0.0000

R-squared	0.506094	Mean dependent var	0.091923
Adjusted R-squared	0.502236	S.D. dependent var	29.26281
S.E. of regression	20.64561	Akaike info criterion	8.908148
Sum squared resid	54558.90	Schwarz criterion	8.952264
Log likelihood	-577.0296	F-statistic	131.1589
Durbin-Watson stat	1.999311	Prob(F-statistic)	0.000000

Month-on-month Inflation Rate (at level)

Null Hypothesis: MOM_INFLATION_RATE has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic based on SIC, MAXLAG=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.490631	0.1201
Test critical values:	1% level	-3.481217	
	5% level	-2.883753	
	10% level	-2.578694	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MOM_INFLATION_RATE)
Method: Least Squares
Date: 05/04/13 Time: 09:00
Sample (adjusted): 2000M03 2010M12
Included observations: 130 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MOM_INFLATION_RATE(-1)	-0.068863	0.027649	-2.490631	0.0140
D(MOM_INFLATION_RATE(-1))	0.303049	0.084803	3.573584	0.0005
C	0.843147	0.371506	2.269538	0.0249

R-squared	0.114221	Mean dependent var	0.107692
Adjusted R-squared	0.100271	S.D. dependent var	2.515829
S.E. of regression	2.386366	Akaike info criterion	4.600227
Sum squared resid	723.2321	Schwarz criterion	4.666401
Log likelihood	-296.0147	F-statistic	8.188270
Durbin-Watson stat	2.000123	Prob(F-statistic)	0.000452

Inflation Rate (at first difference)

Null Hypothesis: D(MOM_INFLATION_RATE) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.611154	0.0000
Test critical values:	1% level	-3.481217	
	5% level	-2.883753	
	10% level	-2.578694	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MOM_INFLATION_RATE,2)
Method: Least Squares
Date: 05/04/13 Time: 09:01
Sample (adjusted): 2000M03 2010M12
Included observations: 130 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MOM_INFLATION_RATE(-1))	-0.733626	0.085195	-8.611154	0.0000
C	0.079006	0.213707	0.369693	0.7122

R-squared	0.366813	Mean dependent var	0.000000
Adjusted R-squared	0.361866	S.D. dependent var	3.047429
S.E. of regression	2.434386	Akaike info criterion	4.632531

Sum squared resid	758.5580	Schwarz criterion	4.676647
Log likelihood	-299.1145	F-statistic	74.15197
Durbin-Watson stat	1.971925	Prob(F-statistic)	0.000000

APPENDIX IV: REGRESSION RESULTS

Dependent Variable: D(MOM_INFLATION_RATE)
Method: Least Squares
Date: 05/04/13 Time: 09:07
Sample (adjusted): 2000M02 2010M12
Included observations: 131 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LENDING_RATE	-0.029194	0.077392	-0.377216	0.7066
MOM_GROWTH_IN_M3_ANNUALI	0.013360	0.016494	0.809986	0.4195
MOM_GROWTH_IN_PRIVATE_SE	0.000736	0.012223	0.060241	0.9521
C	0.707950	1.304027	0.542895	0.5882

R-squared	0.005853	Mean dependent var	0.099237
Adjusted R-squared	-0.017631	S.D. dependent var	2.508002
S.E. of regression	2.530015	Akaike info criterion	4.724386
Sum squared resid	812.9237	Schwarz criterion	4.812178
Log likelihood	-305.4473	F-statistic	0.249242
Durbin-Watson stat	1.457941	Prob(F-statistic)	0.861751

APPENDIX V: SPECIFICATION TEST

Ramsey RESET Test:

F-statistic	1.135198	Probability	0.288707
Log likelihood ratio	1.174960	Probability	0.278384

Test Equation:
Dependent Variable: D(MOM_INFLATION_RATE)
Method: Least Squares
Date: 05/04/13 Time: 09:12
Sample: 2000M02 2010M12
Included observations: 131

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LENDING_RATE	-0.038699	0.077864	-0.497011	0.6200
MOM_GROWTH_IN_M3_ANNUALI	0.021581	0.018202	1.185644	0.2380
MOM_GROWTH_IN_PRIVATE_SE	0.005058	0.012872	0.392952	0.6950
C	1.076570	1.348472	0.798363	0.4262
FITTED^2	-3.635489	3.412142	-1.065457	0.2887

R-squared	0.014730	Mean dependent var	0.099237
Adjusted R-squared	-0.016548	S.D. dependent var	2.508002
S.E. of regression	2.528669	Akaike info criterion	4.730684

Sum squared resid	805.6651	Schwarz criterion	4.840424
Log likelihood	-304.8598	F-statistic	0.470930
Durbin-Watson stat	1.463625	Prob(F-statistic)	0.756984

Categories of Money

According to the Central bank Annual report, money may be categorized as follows :

M1 comprises of currency, notes and coins held by public, demand deposits, current account balances in commercial banks, and travelers' check. Money in this category is sometimes referred to as transaction money and commonly fulfils the function of medium of exchange.

M2 comprises all items in M1 and all short time deposits savings deposits in any deposit taking institution as well as small time deposits at all depository institution and money market mutual funds.

M3 comprises M2 plus large time deposits at all depository institutions, term deposits, foreign currency deposits held by residents with banking institutions and money market mutual shares.

L comprises all instruments defined in M3 plus Bankers acceptances, commercial paper, savings bonds and short term treasury securities.