3000/=

EFFECTS OF MONETARY POLICY CHANGES ON CREDIT AND ECONOMIC GROWTH IN KENYA

ELIJAH RUTTOH CHEBET

A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF APPLIED ECONOMICS IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR AWARD OF MASTER OF ECONOMICS (ECONOMETRICS) DEGREE OF KENYATTA UNIVERSITY

MAY 2010

DECLARATION

This research proposal is my original work and has not been presented for a degree award in any University.

Signature..... Date.....23/06/2010

Elijah Ruttoh Chebet

REG. No. K102/PT/10824/08

This research paper is submitted for review with our approval as supervisors

Signature..... Date.....06/07/2010

Dr. Jacob Oduor

Department of Econometrics and Statistics

KENYATTA UNIVERSITY

Signature..... Date.....25.06.2010

Dr. Paul Gachanja

Department of Economic Theory

KENYATTA UNIVERSITY

DEDICATION

Dedicated to my dear wife Mary and sons Oneronny and Donmyles, my parents and friends.

ACKNOWLEDGEMENTS

I am sincerely grateful to the almighty God who has granted me favor of knowledge and good health to have come this far. I am also grateful to my supervisors Dr. Jacob Oduor and Dr. Paul Gachanja, not forgetting Dr. Almadi Obere for their support, guidance, encouragement and constructive criticism to ensure that the Research is done to satisfaction.

Lots of gratitude also goes to my dear wife, sons, parents, siblings, colleaugues, friends (Martin, Moses and Grace) and the entire fraternity of the Kenyatta University School of Economics for their encouragement and prayers which contributed to the success of this research.

TABLE OF CONTENTS

DECLARATION ii

DEDICATION iii

ACKNOWLEDGEMENTS iv

TABLE OF CONTENTS v

LIST OF ACRONYMS viii

LIST OF TABLES ix

LIST OF FIGURES x

ABSTRACT xi

CHAPTER ONE 1

1.1 Background 1

1.2 The Role of Monetary Policy in Credit and Economic Growth 4

1.2.1 Kenyan GDP Growth and Credit Growth Profile 6

1.3 Statement of the problem 9

1.4 Research Questions 10

1.5 Objectives of the study 11

1.5.1 General objectives 11

1.5.2 Specific Objectives 11

1.6 Significance of the study 11

1.7 Scope and limitation of the study 12

1.8 Organization of the study 12

CHAPTER TWO 13

LITERATURE REVIEW 13

2.1 Introduction 13

2.2 Theoretical Literature 13

2.2.1 The Balance-Sheet Channel 14

2.2.2 The Bank-Lending Channel 18

2.3 Empirical Literature 18

2.4 Overview of literature 29

CHAPTER THREE 30

METHODOLOGY 30

3.1 Theoretical Model 30

3.2 Empirical Model 30

3.2.1 Vector Autoregression (VAR) 32

3.2.2 Impulse Response 33

3.2.3 Variance Decomposition 34

3.2.4 Cointegration tests 34

3.3 Data sources 35

3.4 Definition and Measurement of variables 36

CHAPTER FOUR 37

DATA ANALYSIS AND INTERPRETATION 37

4.1 Introduction 37

4.2 Unit root tests 37

4.3 Impact of Monetary Policy on Economic Activity through Credit Growth in Kenya 40

4.4 Sources of variation in Credit Growth and Economic Growth in Kenya.... 45

4.5 Cointegration tests 49

CHAPTER FIVE 52

SUMMARY, CONCLUSION AND POLICY RECOMMENDATIONS 52

5.1 Introduction 52

5.2 Summary and conclusions 52

5.3 Policy Recommendations 53

5.4 Suggestions for Further Research 54

REFERENCES 55

APPENDIX 60

LIST OF ACRONYMS

CBD	Commercial Bank Deposits
CBK	Central Bank of Kenya
CBR	Central Bank Rate
CRR	Cash Reserve Ratio
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
IMF	International Monetary Fund
KES	Kenya Shillings
LA	Loans and Advances
LR	Lending Rates
M2	Money Supply M2
MPC	Monetary Policy Committee
SME	Small and Medium-sized Enterprises
USA	United States of America
VAR	Vector Autoregression
VECM	Vector Error Correction Model

LIST OF TABLES

Table 3.1 Variables used in the Model 36

Table 4.1 Unit roots tests at levels 38

Table 4.2 Unit roots tests at first difference 39

Table 4.3 Trace Cointegration tests 50

LIST OF FIGURES

Figure 1.1 Lending and Central Bank rates in Kenya between 2008 and 2010..... 3

Figure 1.2 Economic and credit growth rates in Kenya between 1998 and 2008 ... 7

Figure 4.1 Responses of variables to shocks from other variables in the system.. 40

Figure 4.2 Sources of Credit Growth variations in Kenya..... 46

Figure 4.3: Sources of GDP variations in Kenya..... 47

ABSTRACT

Several empirical studies have confirmed that there is a positive relationship between credit growth and economic growth. The Central Bank of Kenya (CBK) has in the past attempted to use monetary policy to influence the direction of credit growth with the aim of improving economic growth in Kenya.

The objective of this study therefore is to determine whether there is a relationship between credit growth and economic growth, whether an increase in credit does in fact improve economic growth in Kenya and whether a reduction in the CBR reduces the commercial bank lending rates and thereby increasing the amount of credit available in Kenya.

Using data between 1971 and 2008 and Vector Autoregression (VAR) model, it is found that even though credit growth deviates so much from the long run trend, it still traces economic growth and therefore using monetary policy to target credit growth with the aim of influencing the direction of economic growth is still beneficial in the long run. The results also show that lending rates reduces following an expansionary monetary policy. This is consistent with expectations but the lending rates seem to respond a bit sluggishly. The findings further show that loans and advances will increase if there is a positive shock in the lending rates. This finding is contrary to expectations. This positive impact could imply that loan demand in Kenya is inelastic. The findings further show that, other than own shocks, the variations in credit growth mainly come from the changes in lending rates and GDP. More emphasis therefore need to be put in these two variables to avoid too violent volatility of credit growth.

CHAPTER ONE

1.1 Background

In an effort to achieve higher economic growth rates, policy makers around the world have empasized the importance of financial market developments and in particular the availability of credit for investment. Several empirical studies around the world show that credit market development promotes economic growth. King and Levine (1993) find a causal relationship between the two. The general idea that economic growth is related to financial development and structure can be traced back to Schumpeter (1911) who highlights the possibility that financial institutions can actively spur innovation and growth by identifying and funding productive investments. McKinnon (1973), Shaw (1973) and Fry (1988), have supported the postulation that financial development spurs economic growth on the significance of banks to the growth of the economy. In assessing the relationship, other empirical studies have relied on measures of size or structure to provide evidence of a link between financial system development and economic growth.

Beck *et al.* (2005), Levine (2002) and Boyreau-Debray (2003) emphasise the importance of bank intermediation efficiency in allocating credit. According to them, credit to the public sector is weak in generating growth within the economy because it is prone to waste and politically motivated programmes which may not

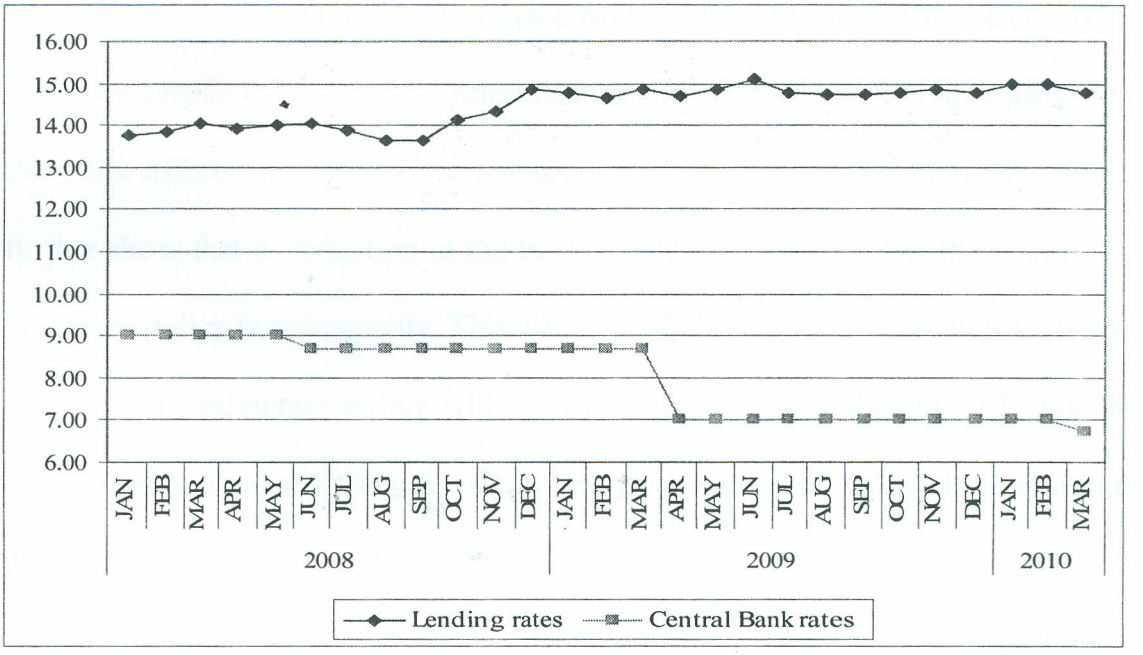
deliver the best result. They conclude that credit has a positive impact on growth when efficiently channeled.

Eita (2007) in examining causality between credit development and economic growth for Botswana found that there is a positive causal relationship between the two. These results are consistent with those obtained by Odhiambo (2005) for Tanzania, Ghali (1999) for Tunisia, Choe and Moosa (1999) for Korea which all show a positive relationship between credit growth and economic growth. De Gregorio and Guidotti (1995) found that the development of credit markets has no effect on economic growth in high-income countries, while it has a strongly positive effect in low- and middle-income countries.

From the preceding discussions, there seems to be concensus in the literature that high credit growth will lead to high economic growth. In this light, policy makers have conluded that one of the avenues to improve economic growth is to hasten the pace of credit growth. The logic behind this reasoning is that improved credit growth automatically leads to improved economic growth. In the same wisdom, the Central bank of Kenya (CBK) has in the past (2008 - 2010) embarked on a vigorous expansionary monetary policy stance in order to expand credit growth with the objective of improving economic growth. To expand credit growth, CBK has reduced the central bank rate (CBR) from a high of 9 percent in 2009 to a low of 6.75 percent by March 2010. However, the commecrial banks did not respond

to the changes in the CBR and their lending rates remained relatively unchanged as shown in Figure 1.1. Without a change in the lending rates, credit availability does not change as a result of the changes in the CBR. This therefore means that monetary policy changes will not affect economic growth if monetary policy (CBR) changes do not affect the lending rates and credit. Changes in credit may therefore come from other factors but not because of changes in monetary policy. In this scenario, it is also possible that credit growth will not automatically lead to economic growth. It is no surprise therefore that even though credit has been growing in Kenya, the economy has not grown proportionately. The question therefore is whether it is still beneficial to use monetary policy to influence the level of credit growth and economic growth.

Figure 1.1 Lending and Central Bank rates in Kenya between 2008 and 2010



Data source: Central Bank of Kenya website at http://www.centralbank.go.ke/Publications/default.aspx

The figure 1.1 above shows that even when CBR was dropping, the lendings rates were in fact increasing. This is contrary to the expectations and against the CBK objective of reducing the CBR in order to reduce the lending rates.

1.2 The Role of Monetary Policy in Credit and Economic Growth

The central objective of monetary policy is price stability - that is low inflation that untimately leads to sustainable economic growth. To achieve this objective, monetary authorities use different monetary policy instruments to influence the level of credit with the aim of influencing investment demand and ultimately aggregate demand and GDP growth in the economy. There are several channels through which monetary policy effects can be transmitted to the aggregate economy. These include the credit channel, the exchange rate channel, the interest rate channel and the other asset prices channel. The emphasis of this study is on the credit channel since it is expected that changes in the CBR as implemented by the CBK affects the aggregate economy through the credit channel. The results further show that a reduction in the bank lending rates respond to the changes in monetary policy but sluggishly. This finding is in line with the expectation that an expansionary monetary policy will increase bank liquidity thereby reducing the lending rates. The only thing the CBK need to worry about is the slaggish nature of the response.

The credit channel of monetary policy transmission mechanism foresees that monetary policy will influence aggregate demand and income growth through its effects on demand for investment funds. A loose monetary policy will induce a reduction in the bank lending rates creating an incentive for credit growth which ultimately leads to higher economic growth. Monetary policy actions are therefore supposed to be reflected in the way credit growth tracks economic growth. If economic growth does not respond to credit growth, then that means that monetary policy effects do not impact on economic growth and therefore the central objectives of monetary policy of price stability and employment creation will not be achieved. In other words, monetary policy will in this case be ineffective in influencing economic growth. As mentioned earlier, economic growth in Kenya does not seem to move in tandem with the growth in credit. This may be a pointer to lack of transmission of monetary policy effects to the aggregate economy through the credit channel. If indeed this is the case, then monetary policy changes will not affect economic growth. This should be a major concern for monetary policy makers since then monetary policies geared towards manipulating economic growth and price stability through changes in the credit path will not achieve much. According to the conventional credit channel of the monetary policy transmission mechanism, lack of transmission of credit growth to economic growth can happen if the growth in credit is not used for investment purposes.

The credit channel of the monetary policy transmission mechanism is such that an expansionary monetary policy will lead to increased bank liquidity, reducing lending rates and increasing deposits. With increased deposits, more loans will be disbursed and if the loans are invested, then investments will go up and this will in turn translate to growth in output.

From the schematic relationship, it is clear that credit growth will affect economic growth if the commercial banks in fact reacts to the changes in monetary policy. If the banks do not respond to the changes in monetary policy, the channel will not work. On the other hand, if banks respond to the changes and increase their lending but the increase in credit is not used for investments, then the credit growth will not affect GDP growth. In this case, policy makers will need to put measures in place to encourage investments.

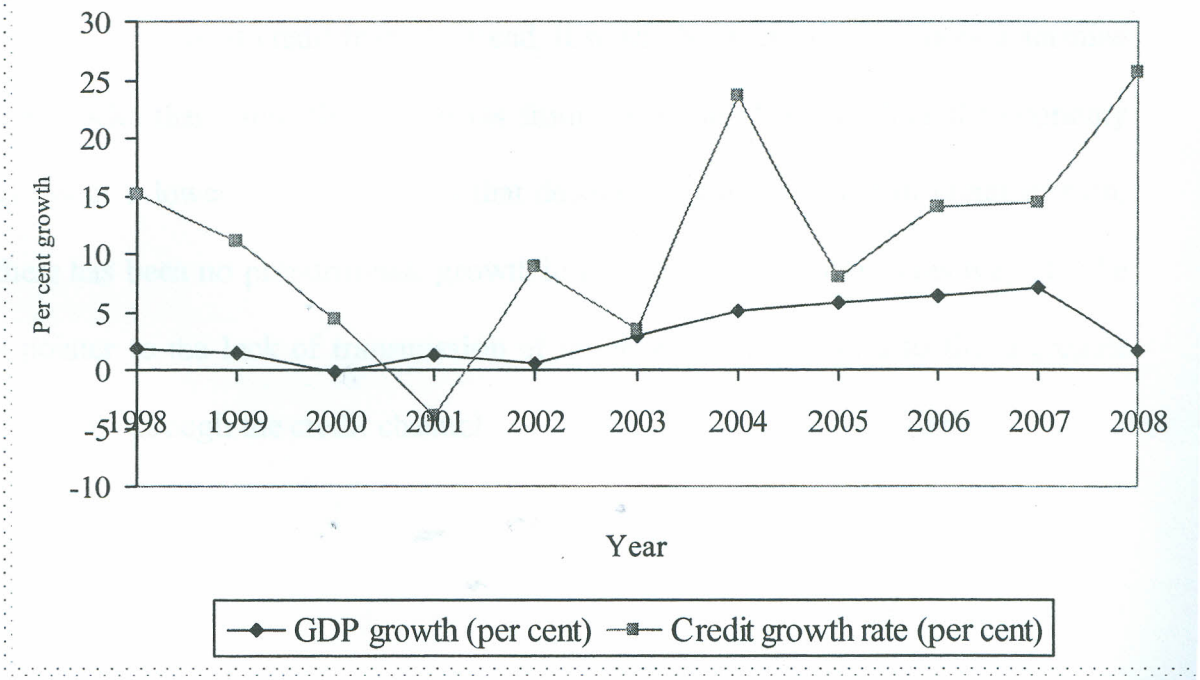
1.2.1 Kenyan GDP Growth and Credit Growth Profile

In recognition of the important role of credit expansion in economic growth, the Kenyan government through the Central Bank of Kenya (CBK)'s Monetary Policy Committee (MPC) decided to use the CBR and Cash Reserve Ratio (CRR) to increase the amount of credit in the economy. The CBK for instance reduced the CBR from 9.0 per cent to 6.75 per cent between 2007 and March 2010 and the CRR from 6.0 per cent to 4.5 per cent, with the intention of improving liquidity in

the economy. The MPC's decision to cut the CRR from 5.0 per cent to 4.5 percent in July 2009 is estimated to have released over KES 5 Billion into the economy given that the total bank customer deposits was about KES 1 trillion (CBK , Jan 2010).

In the Kenyan situation, credit between 1998 and 2008 grew in absolute terms. Figures from various economic surveys show that the total credit by commercial banks to the economy grew from Kshs. 234 billion in 2001 to Kshs. 642 billion in 2008 (Economic surveys (2002-2009)) as shown in figure 2 below.

Figure 1.2 Economic and credit growth rates in Kenya between 1998 and 2008



Source: Economic surveys figures (2002-2009)

In 2001, economic growth decelerated from 1.2 per cent to 0.6 per cent in 2002 despite credit growing from negative 4.0 per cent to positive 9.98 per cent in the same period. From 2002 to 2007 there was positive growth in both credit and the economy though credit was growing at a higher rate than the economy. There are episodes in between 1998 and 2007 when as credit grew, GDP declined as was the case between 2001-2002 and 2007-2008. On the other hand, there are episodes in between 1998 and 2007 when as credit growth declined, GDP growth incresed, as was the case beween 2002-2003 and 2004-2005. This shows that contrary to what literature proposes, an increase in credit growth has not automatically led to economic growth in Kenya, and a decline in credit growth has not automatically led to economic decline in Kenya. From Figure 2, there seems to be a trend between credit growth and economic growth. However, there seems to be very large deviations of credit from the trend. It would be interesting to know determine the shocks that cause the deviations from the trend. The fact that the economy grows at a lower rate also shows that despite the improvement in credit growth, there has been no proportionate growth in the Kenyan economy. This may also be a pointer to the lack of transmission of monetary policy effects to the aggregate economy through the credit channel.

1.3 Statement of the problem

There is concensus in the literature that high credit growth will lead to high economic growth. Policy makers globally have used this relationship to target increased credit growth with the aim of improving economic growth. The Central Bank of Kenya (CBK), following this argument, during the period (2008 -2010) embarked on a vigorous expansionary monetary policy stance aimed at expanding credit growth and therefore economic growth. The CBK attempts to achieve improved credit growth by reducing the central bank rate (CBR) which is intended to increase bank liquidity leading to a reduction in commercial bank lending rates. However, the commecrial banks did not respond to the changes in the CBR and their lending rates remained relatively unchanged. Without a change in the lending rates, credit cannot grow even if the CBK changed the central bank rate. This means that monetary policy changes will not ultimately affect economic growth if changes in monetary policy do not affect the lending rates and credit. Changes in credit may therefore occur as a result of changes in other factors but not necessarily because of changes in monetary policy. In this case, it is unclear whether it is still beneficial to use monetary policy to influence the level of credit growth and economic growth when in actual sense the commercial bank lending rates do not respond to monetary policy changes. In the case where monetary policy fails to change the direction of economy activity, further reduction of CBR will only be an exercise in futility.

Literature suggests that an increase in credit will automatically lead to an improvement in economic growth. In the case of Kenya, credit has been growing yet the economy seems not to growt proportionately. Though credit growth and economic growth as seen in Figure 2 seem to follow the same trend, the deviations of credit growth from the trend are too violent. It is therefore important to determine whether credit growth determines the level of economic growth in the long run in the face of these large deviations.

1.4 Research Questions

From the background and problem statement, there are several policy questions that need attention. The following questions therefore arise from the research problem.

- Do monetary policy changes affect credit growth?
- Is there a long run relationship between credit growth and economic growth in Kenya?
- What are the sources of deviations in credit growth?

1.5 Objectives of the study

1.5.1 General objectives

In line with the research questions, the general objective of this study is to establish whether monetary policy changes influence the direction of both credit growth and economic activity in Kenya.

1.5.2 Specific Objectives

(i) To determine whether monetary policy changes influence the direction of credit growth in Kenya.

(ii) To determine whether there is a long-run relationship between credit growth and economic growth in Kenya.

(iii) To establish what accounts for the large deviations in the credit growth path.

1.6 Significance of the study

Establishing the effectiveness of monetary policy effects on both credit growth and economic growth is important for the CBK, since it will document the efficacy of its initiatives. If it is found out that credit growth and economic growth does not respond to monetary policy changes, then the CBK is better off using other monetary policy instruments other than the CBR and focus on the other channels of monetary policy transmission mechanism like the other asset prices channel or

the exchange rate channel to stimulate economic growth. Alternatively, the findings from this study can act as a basis of assessing and improving the effectiveness of the credit channel of the monetary policy transmission mechanism.

1.7 Scope and limitation of the study

The scope of this study is limited to the credit channel of the monetary policy transmission mechanism. This in our view is limited and it would be interesting to determine how monetary policy affects the aggregate economy through the other transmission channels. However, this study is not able to do all this as this may be too huge a task for the timeline of this study.

1.8 Organization of the study

The remaining part of this study is organized as follows; Chapter Two reviews the literature on credit growth and economic growth, Chapter Three develops the methodology for the study, chapter four presents the findings of the study while chapter five gives the summary, conclusions and policy recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews both the theoretical literature on credit growth-economic growth relationship (mainly the credit channel) and empirical literature on financial sector development and credit growth on economic growth.

2.2 Theoretical Literature

According to the credit channel, an external financial premium, which is a wedge between the costs of funds raised externally (by issuing equity or debt) and the opportunity cost of funds raised internally (by retaining earnings), has an important role in economic activities. The size of an external finance premium reflects imperfections in credit markets that drive a wedge between the expected return received by lenders and the costs faced by potential borrowers. Monetary policy, which alters interest rate, tends to affect the external finance premium in the same direction. Thus, the direct effects of the monetary policy on interest rate are amplified by changes in the external financial premium. This complementary movement in the external finance premium may help explain the strength, timing, and composition of the monetary policy effects better than a reference to interest rates alone. Two mechanisms have been suggested to explain the link between

monetary policy actions and the external finance premium: the balance sheet channel and the bank-lending channel.

Monetary policy affects not only the general level of interest rates, but also the size of the external finance premium. This complimentary movement in the external finance premium will help explain the strength, timing and composition of monetary policy effects better than is possible by reference to interest rates alone. Banks, which remain the dominant source of intermediated credit in most countries, specialize in overcoming informational problems and other frictions in credit markets. If the supply of bank loans is disrupted for some reason, bank-dependent borrowers may not be literally shut off from credit, but they are virtually certain to incur costs associated with finding a new lender. Therefore, a reduction in the supply of bank credit, relative to the other forms of credit, is likely to increase the external finance premium and reduce real activity. This is why the credit channel of the monetary policy transmission mechanism was more preferred in this study.

2.2.1 The Balance-Sheet Channel

The balance-sheet channel is based on the theoretical prediction that the external finance premium facing a borrower should depend on borrower's financial position. That is, the greater the borrower's net worth, the lower the external finance premium should be. Since borrowers' financial positions affect the

external finance premium and thus the overall terms of credit that they face, fluctuations in the quality of borrowers' balance sheet similarly should affect their investment and spending decisions.

The balance-sheet channel of monetary policy arises because the shifts in policy affect not only market interest rates but also the financial positions of borrowers, both directly and indirectly. A tight monetary policy directly weakens borrowers' balance sheets in at least two ways. First, rising interest rates directly increase interest expenses, reducing net cash flows and weakening the borrower's financial position. Second, rising interest rates are also typically associated with declining asset prices, which among other things shrink the value of the borrower's collateral. Indirect effect of tight monetary policy on net cash flows and collateral values is from deterioration in consumer's expenditure. The firm's revenues will decline while its various fixed or quasi-fixed costs do not adjust in the short run. The financing gap, therefore, erodes the firm's net worth and credit worthiness over time.

Lower net worth implies that lenders have less collateral for their loans, thus increasing losses from adverse selection. A decline in net worth, which raises the adverse selection problem, leads to decreased lending to finance investment spending. Lower net worth of business firms also increases the moral hazard problem because it means that owners have a lower equity stake in their firms, giving them more incentive to engage in risky investment projects. Since taking

on riskier investment projects makes it more likely that lenders will not be paid back, a decrease in business firms' net worth leads to a decrease in lending and hence in investment spending. This mechanism may explain why the impact of the credit channel on spending, particularly on inventory and investment spending, may persist well beyond the period of the initial monetary tightening (financial accelerator problem).

The balance-sheet channel can be subdivided into five sources. The first source is through net-worth whereby contractionary monetary policy leads to a decrease in the prices of equity and real assets (low net-worth). This means that lenders have less collateral for their loans and so losses from adverse selection are higher. The low collateral leads to decreased lending to finance investment spending and hence a decrease in real activity. Domar (1999) demonstrated that the mechanisms can be depicted in such a way that a contractionary monetary policy decreased the prices of equity and real estate which will in turn increase adverse selection and moral hazards. Lending rates will then decrease as well as investment levels, hence national income and prices decrease.

The second source is the cash flow, which operates through its effect on cash. An expansionary monetary policy, which lowers the interest rate, also leads to an improvement in corporate balance sheet since it increases cash flow. The increase in cash flow improves the balance sheet in that it raises the liquidity of the firm (or household) and thus makes it easier for lenders to know whether the firm (or

household) will be able to pay its bills. Consequently, the adverse selection and moral hazard problems become less severe, leading to an increase in lending and economic activity. According to Domar (1999), an expansionary monetary policy lowers interest rates, increases cash flow, lowers adverse selection and moral hazards, hence lending rates increase which will in turn increase investment and consumption levels and ultimately national output and prices go up.

The third source is household liquidity effects whereby balance-sheet effects impact on consumers' desire to spend. This emanates from the fact that under contractionary monetary policy, an attempt to cushion the effects of bad income shock through sale of illiquid assets (e.g., consumer durables and housing) may result in big losses because of depressed asset prices. Domar (1999) showed that a contractionary monetary policy lowers the prices of equity and real estate, decreases financial assets, hence likelihood of financial distress increases and this decreases consumer durables and housing expenditure, hence national income and prices decrease.

Domar (1999) argued that the fourth source is perceived riskiness of loans, which states that a contractionary monetary policy increases interest risk which will increase adverse selection, hence lending decreases, level of investment also decreases and ultimately national income and prices decrease.

The final source according to Domar (1999) is nominal debt contracts. This is where a contractionary monetary policy leads to unanticipated prices, causing adverse selection and moral hazards to rise which will in turn decrease lending, lower investment levels and ultimately the national income and prices go down.

2.2.2 The Bank-Lending Channel

Monetary policy may affect the external finance premium by shifting the supply of credit, particularly loans by commercial banks. According to this view, banks play a special role in the financial system because they help solve asymmetric information problems in credit markets. When the supply of bank loans is disrupted, bank dependent borrowers may not be literally shut off from credit. However, they may incur costs associated with finding a new lender. Therefore, decreasing the supply of loans is more likely to increase the external finance premium and reduce real economic activity.

2.3 Empirical Literature

Robinson (1952) was of the opinion that economic activity propels banks to finance enterprises. That is to say, where enterprises lead, finance follows. Gurley and Shaw (1967), Goldsmith (1969), McKinnon (1973), Shaw (1973), and Beck *et al.* (2005) all suggest that credit growth can foster economic growth by raising savings, improving allocative efficiency of loanable funds and promoting capital

accumulation for investment. In addition, several contemporary empirical studies show that a range of financial indicators is robustly and positively correlated with economic growth. The present study sought to determine the effect of credit growth on economic growth.

Goldsmith (1969) who used an alternative view of emphasizing the role of capital accumulation in economic growth found out that overall financial development matter for economic success as it lowers market friction which increases the domestic savings rate and attracts foreign capital. To Goldsmith, financial policies such as direction of credit to sectors itself do not seem to matter much. Goldsmith is of the opinion that policy makers may achieve greater returns by focusing less on the extent to which their country is bank based or market based and more on legal, regulatory and policy reforms that boost the functioning of the markets and banks. Using data from 35 countries between 1860 and 1963, he empirically concluded that "a rough parallelism exists between economic and credit growth in the long run". Using impulse response graphs, the present study sought to determine the impact of the credit market in Kenya on the aggregate economy.

Lucas (1988) believed that economists have badly overstressed the role of financial factors in economic growth. In essence, banks only respond passively to industrialisation and economic growth. Empirically, a re-examination by Favara

(2003) of the analysis of Levine *et al.* (2000) used the panel estimation technique and reported that relationship between credit growth and economic growth is at best weak. From this, there is no indication that finance spurs economic growth, rather for some specifications, the relationship is puzzlingly negative. Therefore, the effect of credit growth on economic growth is ambiguous and not robust to alternative dynamic specifications. This he attributed to the fact that credit growth does not have a first order effect on economic growth; the link between them is not linear and if the dynamic specification and slope heterogeneity across countries are taken into account, the effect is negative. The study by Muhsin and Eric (2000) on Turkey further lends credence to this postulation. According to their study, when bank deposit, private sector credit or domestic credit ratios are alternatively used as proxy for financial development; causality runs from economic growth to credit growth. They therefore concluded that growth seems to lead financial sector development. The present study used commercial bank deposits to get the response of GDP to shocks from commercial bank deposits.

Demetriades and Hussein (1996) conducted a study on 16 less developed countries between 1960 and 1990 with the aid of time series technique. They observed long run relationship for indicators of financial development and per capita GDP in 13 countries. However, they found bi-directional causality in six countries and reverse causality in six countries while South Africa showed no evidence of causation between the variables. Likewise, Odedokun (1998) used the ordinary least square

method and reported varying degree of effects of finance on growth for both high and low income groups in the developing countries. The present study sought to determine the relationship between credit growth and economic growth in Kenya.

Several studies have adopted various measures of financial development. For example, Allen and Ndikumama (1998) used credit to the private sector, volume of credit provided by banks and liquid liabilities of the financial system (measured by M3). King and Levine (1993) used the ratio of liquid liabilities of the financial system to GDP; ratio of deposit money bank domestic assets to deposit money bank domestic assets plus central bank domestic assets and ratio of claims on the nonfinancial private sector to total domestic credit. Oura (2008) used the ratio of external (bank) finance to total firm finance while Davis (2004) used four variables as indicators of financial development namely – stock market capitalisation, stock market turnover, listed companies and credit. There have been other studies also that used stock market indicators, which indicate financial development for more advanced countries. The present study used Money supply M2, Lending rates, Commercial bank deposits and Loans and advances as measures of financial development.

Giovanni and Kang (1999)'s study for Korea shows that monetary tightening broadens the spread between marginal lending rates and corporate commercial paper rates for most of the banks. In addition, Banks suffering from larger

negative capital shocks also experience a more marked slow-down in the expansion of loans and also disproportionately raise their lending rates. Furthermore Kim (1999) found evidence of the practical importance of the bank-lending channel in the monetary transmission mechanism in Korea, particularly following the financial crisis in 1997. The present study looked into the effects of an expansionary monetary policy on lending rates in Kenya.

Domar (1999) studied the effects of a tightening of monetary policy on large and small manufacturing firms in Malaysia and found that the effect of cash flow squeeze on economic behaviour depends largely on firms' ability to smooth the drop in cash flows by borrowing. The large firms can be at least temporally able to maintain their levels of production and employment in the face of higher interest costs and declining revenues through other sources of short-term credit like commercial paper. The inventories of large firms grow following a tightening of monetary policy. However, the small firms, who have more limited access to short-term credit markets, tend to decumulate inventories by cutting work-hours and production.

Domar notes that as long as there is no perfect substitutability of retail bank deposits with other sources of funds, the operation of bank lending channel of monetary transmission can be explained as follows; Relaxation of monetary

policy, which increases both bank reserves and bank deposits, raises the quantity of bank loans available. Since many borrowers rely on bank loans to finance their activities, this rise in loans will lead to an increase in investment (and possibly consumer) spending. An interesting conclusion from Domar's study is that monetary policy shifts will have a greater effect on small and medium-sized enterprises (SMEs), that are relatively dependent on bank loans, than it has on large firms, that can directly access the credit market via stock and bond markets (e.g. commercial paper) without going through banks.

According to Domar (1999), the bank-lending channel is such that an expansionary monetary policy will lead to increased bank liquidity, reducing lending rates and increasing deposits. With increased deposits, more loans will be disbursed and if the loans are invested, then investments will go up and this will in turn translate to growth in output. The present study sought to determine the response of GDP to shocks from various variables including loans and advances, commercial bank deposits, lending rates and money supply M2.

Gross (2001) used two growth models to examine the impact of financial intermediation on economic growth. Gross stated that economic growth is no longer believed to happen for exogenous reasons; instead governments through appropriate policies particularly with regard to credit growth can influence it. Demirguc-Kunt and Levine (2008) in a review of the various analytical methods used in finance literature, found strong evidence that credit growth is important for

economic growth. To them, it is crucial to motivate policymakers to prioritise financial sector policies and devote attention to policy determinants of credit growth as a mechanism for promoting growth. The present study was looking at the variations in credit that influence economic growth.

Ho (2002) found out that Macao's financial development tends to be positively related to the level of investment, but has little correlation with the improvement in capital productivity. The estimated elasticity of aggregate output with respect to credit ranges from 0.0295 to 0.1066 with an average of about 0.0701. It means that other variables being constant, a one-per cent increase in credit would, on average, bring about 0.0701 per cent expansion in GDP in Macao. Using impulse response graphs, the present study sought to find out the response of GDP to shocks from loans and advances to the private sector in Kenya.

Demetriades and Andrianova (2004) postulate that whether credit growth Granger causes economic growth, it is important that the financial system is well functioning. If so, they believe it will assist the real economy to fully exploit available new opportunities. When there is reverse causation, it is assumed that when the real economy grows, there will be more savings coming into the financial system, which will allow it to extend new loans. This assertion could readily be applied to the Shan and Jianhong (2006) study of China economy where they found a two-way causality between finance and growth. With the aid of VAR

technique and using five variables namely GDP, total credit to the economy, labour, investment and trade, the study observed that financial development was the second most important factor after the contribution from labour force growth in affecting economic growth. The study concluded that Granger causality from GDP growth to financial development is stronger than the causality from finance to GDP growth. The present study sought to determine the monetary policy transmission mechanism that would ensure efficient channeling of credit to spur economic growth.

Loayza and Ranciere (2004) have also found evidence of a negative relationship between short-term (temporary) changes in credit and growth in those countries that present high levels of financial fragility. In general, total domestic credit can be sub divided into two: credit to the private sector and credit to the public sector. It has been empirically proven that credit to the public sector is weak in generating growth within the economy because they are prone to waste and politically motivated programmes which may not deliver the best result to the populace. (See for example Beck *et al.* (2005), Levine (2002), Odedokun (1998), King and Levine (1993)). Boyreau-Debray (2003) found a negative correlation between growth and banking debt due to the fact that Chinese banks were mobilizing and pouring funds into the declining parts of the Chinese State Enterprise, and hence the system has not been growth promoting. Demirguc-Kunt and Levine (2008) emphasised the importance of focusing on allocation of credit to the private sector as opposed to

all bank intermediation. Similarly, Beck *et al.* (2005) also observe private credit as a good predictor of economic growth while a study by Crowley (2008) also supported this position. The present study emphasized on credit to the private sector as a factor that causes economic growth in Kenya.

Habibullah and Eng (2006) using the Generalized Method of Moments (GMM) technique developed by Arellano and Bover (1995) and Blundell and Bond (1998) conducted causality testing analysis on 13 Asian developing countries. The result is in agreement with other causality studies by Calderon and Liu (2003); Fase and Abma (2003) and Christopoulos and Tsionas (2004). They found that credit growth promotes economic growth, thus supporting the old Schumpeterian hypothesis. The IMF autumn 2008 Global Financial Stability Report detected a statistically significant impact of credit growth on GDP growth. Specifically, it was revealed that "a credit squeeze and a credit spread evenly over three quarters in the United States of America (USA) will reduce GDP growth by about 0.8 per cent and 1.4 per cent points year-on-year respectively assuming no other supply shocks to the system." The present study sought to find out whether there is a causal relationship between GDP growth and credit growth.

Research work by Swiston (2008) on the USA used a Vector Autoregression (VAR) containing two lags to construct a model with variables such as nominal interest rate, yield on investment grade corporate bonds with remaining maturity of

5-10 years to capture long term interest rate, real GDP, oil prices, equity returns and real effective exchange rate made positive contribution in that direction. Swiston posited that credit availability proxied by survey results on lending standards is an important driver of the business cycle, accounting for over 20 per cent of the typical contribution of financial factors to growth. A net tightening in lending standards of 20 per cent basis points reduces economic activity by 0.75 per cent after one year and 1.25 per cent after two years. Despite the above views, growth is at times seen as unrelated to banks. They postulate that economic growth is a causal factor for credit growth. According to them, as the real sector grows, the increasing demand for financial services stimulates the financial sector (Gurley and Shaw, 1967). Using impulse response graphs, the present study sought to determine the response of GDP to shocks from lending rates.

Athanasios and Antonios (2009) investigated the causal relationship between credit growth and economic growth for Greece for the period 1978-2007 using a Vector Error Correction Model (VECM). Questions were raised whether credit growth causes economic growth or reversely taking into account the positive effect of industrial production index. Financial market development is estimated by the effect of credit market development and stock market development on economic growth. The objective of the study on Greece was to examine the causal relationships between these variables using Granger causality tests based on a Vector Error Correction Model (VECM).

The results were that a short-run increase of stock market index per 1 per cent led to an increase of economic growth per 0.06 per cent in Greece, also an increase of bank lending per 1 per cent led to an increase of economic growth per 0.14 per cent in Greece, while an increase of productivity per 1 per cent led to an increase of economic growth per 0.32 per cent in Greece. The estimated coefficient of error correction term found statistically significant with a negative sign, which confirmed that there was not any problem in the long-run equilibrium between the examined variables. The results of Granger causality tests indicated that economic growth caused stock market development and industrial production index, while industrial production index caused credit market development for Greece.

Credit growth follows economic growth as a result of increased demand for financial services. The demand for financial services is dependent upon the growth of real output and upon the commercialization and modernization of agriculture and other subsistence sectors. Thus, the creation of modern financial institutions, their financial assets and liabilities and related financial services are a response to the demand for these services by investors and savers in the real economy. Businesses make new investments to innovative products through bank lending in more developed countries. The results of the study on Greece agree with the studies of Robinson (1952) and Friedman (1963). The present study sought to determine the response of GDP growth to changes in lending rates by commercial banks in Kenya.

Rufael (2009), in re-examining the financial development and economic growth nexus in Kenya using a quadvariate vector autoregressive framework found that in three out of four measures of financial development, there was evidence of a two way Granger causality. The present study used Vector Autoregression (VAR) to determine the causal relationship between credit growth and economic growth in Kenya.

2.4 Overview of literature

Most of the studies on the Kenyan economy have dwelt on the causality relationship between financial development and economic growth. The study by Sichei *et al.* (2004) investigated the existence of the bank lending channel in transmitting policy effects in Kenya. This study is different from the others in that it is looking at the relationship between credit growth and economic growth and the hypothesis that the monetary policy stance is not transmitted through the credit channel of the monetary policy transmission mechanism.

From the above discussions, there seems to be concensus in the literature that high credit growth will lead to high economic growth. In Kenya, the growth in credit does not seem to be correlated with economic growth and therefore the need to determine whether the credit channel of the monetary policy transmission mechanism transmits policy effects to the aggregate economy in Kenya and to determine the shocks in credit that cause economic growth.

CHAPTER THREE

METHODOLOGY

3.1 Theoretical Model

From the reviewed literature, several studies have shown that there is a positive causal relationship between financial development and economic growth. The relationship between the variables used in this study is given as:

$$GDP = f(CBD, LR, LA, M2) \quad \ldots\ldots(3.1)$$

The study focused on the credit channel of the monetary policy transmission mechanism which according to Domar (1999), an expansionary monetary policy will lead to increased bank liquidity, reducing lending rates and increasing deposits. With increased deposits, more loans will be disbursed and if the loans are invested, then investments will go up and this will in turn translate to growth in output.

3.2 Empirical Model

To achieve the objectives of this study, the study used Vector Autoregression (VAR). VAR is appropriate in this study since it is hypothesized that the variables are contemporaneously related and therefore using a single equation framework would not be appropriate because of the problem of endogeneity. Vector Autoregressions can be used to address the following type of questions:

- How does one variable respond to shocks from other variables?

- What is the contribution of the different shocks to the affected variable?

From the VAR, impulse responses were be generated to address the first objective. From the impulse responses, the study was be able to determine whether and how a shock in monetary policy affects lending rates, how a shock from lending rates affects loan advances and how a shock in loan advances affect economic growth. This helped in determining whether monetary policy changes affect economic growth in Kenya. To address the second objective, the study tested for cointegration among credit growth and GDP growth and the other variables in the credit channel. Cointegration was established among the variables, hence the existence of a long run relationship beween credit growth and economic growth. If the variables were not cointegrated, then credit growth and economic growth do not have a long-run relationship and therefore any changes in monetary policy is not likely to have any long term effects on economic growth. To address the third objective, the study generated variance decomposition of the changes in credit growth to be able to allocate for the deviations of credit growth to the various variables in the system.

Other studies among them the study on Credit Market Development and Economic Growth in India (Mishra *et al.*, 2009) used VAR to test the Granger causality between Bank Credit and Economic Growth. The results were that there was a unidirectional causality running from the Economic Growth to the Credit Market

Development in India which shows that Economic Growth in India has a direct positive effect on Credit Market Development.

The study by Sichei *et al.* (2004) on Monetary Policy Transmission Mechanisms in Kenya using VAR model found that there exists a modest bank lending channel which implies that the monetary policy in Kenya can affect the real economy without much variation in interest rates. Moreover, they found that the loan supply dominates the loan demand effects implying that bank credit supply based policies are important in Kenya.

3.2.1 Vector Autoregression (VAR)

To capture the relationships in the model, the following structural VAR was used;

$$A_0 x_t = \Gamma_0 + \Gamma_1 x_{t-1} + ... + \Gamma_p x_{t-p} + \varepsilon_t \quad \text{.....(3.2)}$$

Where A_0 is a $k \times k$ matrix containing contemporaneous effects with 1s in the leading diagonal, where k is the number of endogenous variables; x_t is a $k \times 1$ column vector containing the endogenous variables and p is the lag legnth determined using the different information criteria. Γ_0 is a $k \times 1$ column vector of intercepts. Γ_1 and Γ_2 are $k \times k$ matrices containing coefficients for lagged variables. ε_t is $k \times 1$ column vector of pure innovations. The variables in the vector x include real gross domestic product (GDP), real deposit levels of commercial banks less the minimum liquid asset level as defined in the Banking

Act, 1968, real lending rates of commercial banks, real commercial bank loans and advances to the private sector and real money supply (M2) to signify monetary policy stance.

Premultiplying equation (3.1) by A_0^{-1} leads to the following reduced form VAR;

$$x_t = \lambda_0 + \lambda_1 x_{t-1} + ... + \lambda_2 x_{t-p} + e_t \quad \text{..... (3.3)}$$

Where $\lambda_0 = (A_0)^{-1}\Gamma_0$, $\lambda_1 = (A_0)^{-1}\Gamma_1$, $\lambda_2 = (A_0)^{-1}\Gamma_2$, $e_t = (A_0)^{-1}\varepsilon_t$

Equation (3.2) is the VAR model which was estimated and from which impulse responses and variance decomposition were generated.

3.2.2 Impulse Response

Impulse response functions are useful for studying the interactions between variables in a vector autoregressive model. An impulse response function traces the response of a variable of interest to an exogenous shock. Often the response is portrayed graphically, with horizon on the horizontal axis and response on the vertical axis. The general equation for impulse response is as shown below:

$$y_t = \sum_{i=0}^{p} \beta_i \mu_{t-i} \quad \text{.....(3.4)}$$

Where y_t is a $(K \times 1)$ vector of endogenous variables, β_i is the i^{th} $(K \times K)$ moving average coefficient matrix and μ_t is a $(K \times 1)$ vector of orthogonal white noise innovations.

3.2.3 Variance Decomposition

Variance Decomposition or Forecast error variance decomposition indicates the amount of information each variable contributes to the other variables in a Vector Autoregression (VAR) model. Variance decomposition determines how much of the forecast error variance of each of the variables can be explained by exogenous shocks to the other variables. In a VAR, the variance decomposition at horizon h is the set of R^2 values associated with the dependent variable y_t and each of the shocks h periods prior. The general equation for variance decomposition is as shown below:

$$X_t = \sum_{i=0}^{\infty} \alpha_i \varepsilon_{t-i} \quad \text{.....(3.5)}$$

Where X_t is a $(K \times 1)$ vector of endogenous variables, α_i is the i^{th} $(K \times K)$ moving average coefficient matrix and ε_t is a $(K \times 1)$ vector of orthogonal white noise innovations.

3.2.4 Cointegration tests

Cointegration tests are a statistical expression of the nature of long-run relationships among variables. Cointegration test will help in determining whether credit growth and economic growth have a long run relationship. If a linear combination of I (1) variables is a stationary process of I (0), then the variables are said to be cointegrated. The concept of cointegration links relationships between integrated processes and the concept of (steady state) equilibrium.

If a time series X_t is I (0), then it is stationary, whereas if it is I (1), its change, ΔX_t is stationary. If X_t and Y_t are both I (1), then it is generally true that the linear combination;

$$Z_t = Y - \alpha X_t \quad \text{.....(3.6)}$$

will also be I (1).

3.3 Data sources

Monthly data from Economic surveys, CBK Publications, World development indicators-World Bank, are used and the study covers the period 1971 to 2008.

3.4 Definition and Measurement of variables

Table 3.1 below shows the variables, their symbols and how they are measured.

Table 3.1 Variables used in the Model

Variable	Definition	Measurement
Economic growth (GDP_t)	Increase in a country's productive capacity comparing two consecutive years	Monthly Real GDP values given in economic surveys at time t
Commercial Bank Deposit levels (CBD_t)	Amount of money commercial banks hold as deposits from their clients	Commercial Bank Deposit levels as given in economic surveys at time t
Loans and advances (LA_t)	Amount of money borrowed by the private sector from commercial banks	Loans and advances as given in economic surveys at time t
Lending rate (LR_t)	The rate of interest paid on loans borrowed from commercial banks	Commercial Bank Lending rates as given in economic surveys at time t
Money supply M2 ($M2_t$)	The total supply of money in circulation in a given country's economy at a given time.	Money supply M2 levels as given in economic surveys at time t

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

In this section, data analysis and interpretation are presented.

4.2 Unit root tests

Most time series data are known to be non-stationary and analysis of such data without correcting for non-stationarity can lead to the problem of spurious correlations (non constant mean, variance and co-variance). Since the data we are using is a time series one, it is important to design the test in such a way that the results will limit the effects that a spurious relationship could have on our data. Stationarity tests were therefore done to establish whether the data are stationary or not and also to determine the order of integration of the variables. The unit root tests were done using the Augmented Dickey Fuller Test (ADF) and Philips Peron (PP) tests. The unit root results revealed that the raw data were non stationary at levels as shown in table 4.1 below;

Table 4.1 Unit roots tests at levels

Variable	ADF Statistics	ADF Critical Values	Phillips Perron Statistics	PP Critical Values	Conclusion
Log GDP	-1.251281	1% = -3.6228 5% = -2.9446 10%= -2.6105	-0.944307	1% = -3.6171 5% = -2.9422 10%= -2.6092	Not stationary
Log CBD	-0.834627	1% = -3.6228 5% = -2.9446 10%= -2.6105	-0.467205	1% = -3.6171 5% = -2.9422 10%= -2.6092	Not stationary
Log LR	-1.596032	1% = -3.6228 5% = -2.9446 10%= -2.6105	-1.538401	1% = -3.6171 5% = -2.9422 10%= -2.6092	Not stationary
Log LA	-1.457989	1% = -3.6228 5% = -2.9446 10%= -2.6105	-1.029965	1% = -3.6171 5% = -2.9422 10%= -2.6092	Not stationary
Log M2	-1.096134	1% = -3.6228 5% = -2.9446 10%= -2.6105	-0.847649	1% = -3.6171 5% = -2.9422 10%= -2.6092	Not stationary

All variables are found to be non-stationary at levels. There is need to find the order of integration of the variables.

Table 4.2 Unit roots tests at first difference

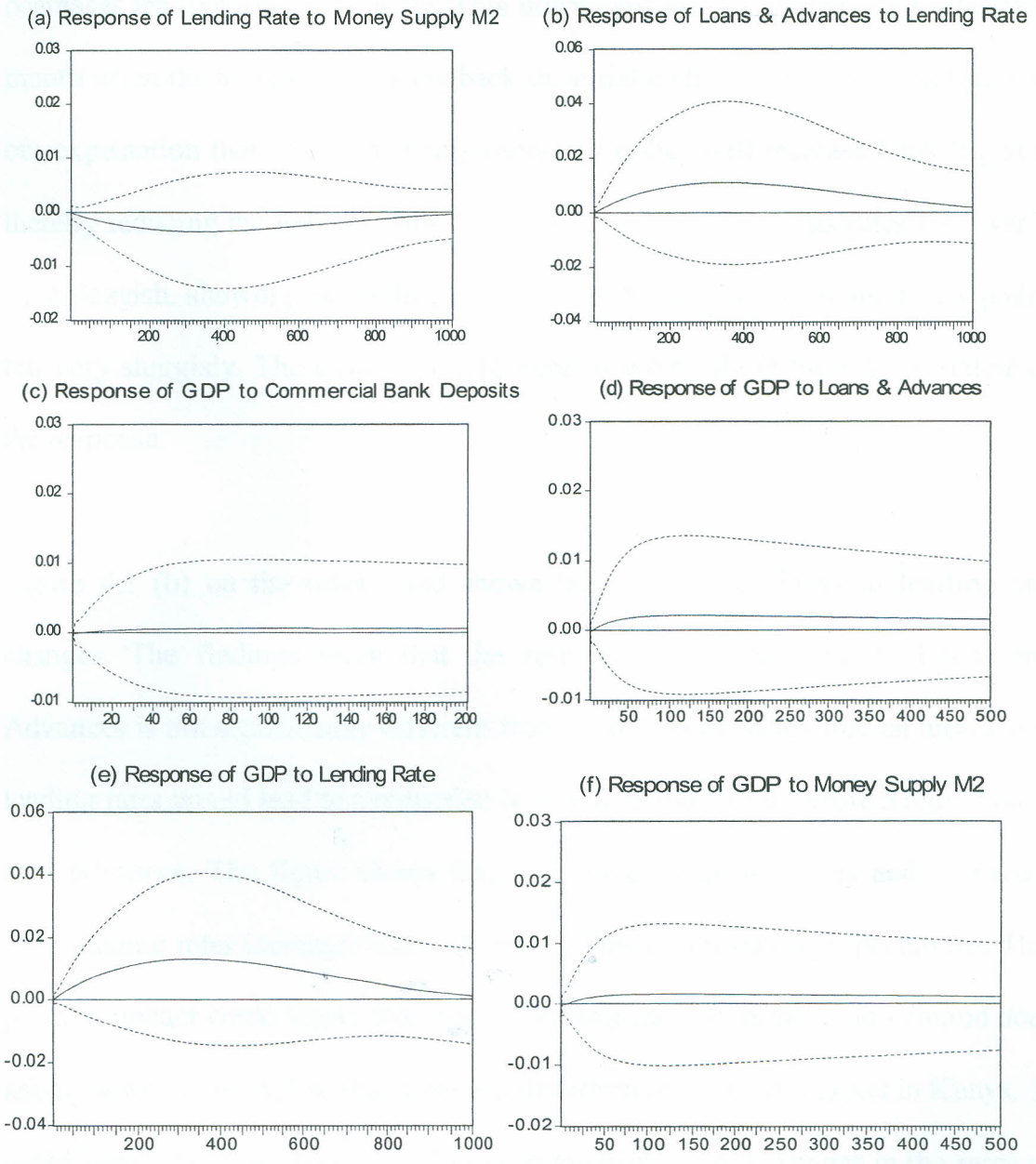
Variable	ADF Statistics	ADF Critical Values	Phillips Perron Statistics	PP Critical Values	Conclusion
Log GDP	-3.400329	1% = -3.6289 5% = -2.9472 10%= -2.6118	-5.004020	1% = -3.6228 5% = -2.9446 10%= -2.6105	Stationary
Log CBD	-3.328284	1% = -3.6289 5% = -2.9472 10%= -2.6118	-6.939132	1% = -3.6228 5% = -2.9446 10%= -2.6105	Stationary
Log LR	-2.753803	1% = -2.6300 5% = -1.9507 10%= -1.6208	-4.428911	1% = -2.6280 5% = -1.9504 10%= -1.6206	Stationary
Log LA	-3.526247	1% = -3.6289 5% = -2.9472 10%= -2.6118	-4.183820	1% = -3.6228 5% = -2.9446 10%= -2.6105	Stationary
Log M2	-3.444599	1% = -3.6289 5% = -2.9472 10%= -2.6118	-4.364836	1% = -3.6228 5% = -2.9446 10%= -2.6105	Stationary

All the variables are integrated of order one i.e I(1) .

4.3 Impact of Monetary Policy on Economic Activity through Credit Growth in Kenya

The impulse response functions generated from the VAR are given in the graph 4.1 below;

Figure 4.1 Responses of variables to shocks from other variables in the system



The impulse response function graph given in figure 4.1 (a) above show the response of lending rates to changes in money supply (which is a proxy for the CBR or the monetary policy stance). The findings show that the response of lending rate to Money supply M2 is not significantly different from zero. The figure shows that, a positive shock to lending rates from Money supply M2 decreases lending rates on impact. This downward trend continues up to the 250th month when the trend starts tracing back its initial path. This finding is in line with our expectation that an expansionary monetary policy will increase bank liquidity thereby reducing the lending rates. The reduction in the lendings rates however is very slaggish, showing the lending rates respond to the changes in monetary poilcy but very sluggisly. The CBK therefore need to worry about the slagish nature of the response.

Figure 4.1 (b) on the other hand shows the response of loans to lending rate changes. The findings show that the response of lending rate to Loans and Advances is not significantly different from zero. It is expected that an increase in lending rates would lead to a reduction in loan demand and therefore a reduction in loan advances. The figure shows that a positive shock to Loans and Advances from lending rates increases loans advanced. This is contrary to expectations. This positive impact could imply that even if lending rates increase, loan demand does not go down. This implies that there is a distortion in the loans market in Kenya. It could imply that loan demand in Kenya is too high so that changes in the price of

loans (lending rate) does not affect the demand. Demand for loans in Kenya therefore seem to be inelastic. The inelasticity in demand for loans may mean that when lending rates increase, commercial banks are enticed to avail even more money as loans given that the banks' interest income now increases and because the banks know that loan demand will not change. These findings are consistent with those of Sichei *et al.* (2004) who found that a positive one standard deviation innovation in real lending rates and excess bank deposit levels lead to an increase in commercial bank loans to the private sector. The inelasticity of demand for loans in Kenya as implied by these findings should be a major concern for the CBK because if loan demand is inelastic, no monetary policy changes will affect credit growth. Indeed these findings are supported by the trends in the loans market in Kenya which shows that even at the time when lending rates have remained relatively high, commecrial banks have contuinued to record tremendous growth in their loan portfolios.

Figure 4.1 (c), shows the response of GDP to changes emanating from commercial bank deposits. The findings show that the response of commercial bank deposits to GDP is not significantly different from zero. The impulse response shows that GDP responds positively to a positive shock from Commercial Bank Deposits (CBD). This shows that increasing bank deposits improves economic performance in Kenya and could imply that as commercial banks get more deposits, they in turn lend it out to private individuals which enhances economic growth. This therefore

means that the transmission of monetary policy effects from the bank deposits to economic growth through the credit channel and therefore the intermediation process between borrowers and lenders is working in Kenya. Beck *et al.* (2005), Levine (2002) and Boyreau-Debray (2003) emphasise the importance of bank intermediation efficiency in allocating credit and therefore this finding is a good indication of the level of banking sector efficiency in Kenya.

Figure 4.1 (d) shows how GDP responds when loans and advances changes. The findings show that the response of loans and advances to GDP is not significantly different from zero. A positive shock to GDP from loans and advances (LA) increases GDP on impact. This upward trend continues until the 80th month when GDP starts falling back gradually and thereafter it takes its initial path. This implies that increase in loans and advances to the private sector improves the level of investment in the economy which eventually leads to economic growth. These findings are consistent with the arguments by Bernanke and Blinder (1988) that an increase in commercial banks' lending to the private sector should increase economic growth. The findings are also consistent with those of Sichei *et al.* (2004), which show that increase in Commercial bank deposit in Kenya leads to increased loans and advances to the private sector, thereby encouraging investment which in turn enhances economic growth. However, the response of GDP does not seem very strong and therefore a policy to encourage private lending should be pursued.

Figure 4.1 (e) shows that GDP responds positively on impact as a result of positive shocks from the lending rate. The findings show that the response of lending rate to GDP is not significantly different from zero. That means that as lending rates increase, GDP increases on impact but reduces with time. Probably GDP increases on impact as commercial banks reap higher profits from the increased lending rates and interest income (since loan demand is inelastic). These findings are similar to the fuindings of Athanasios and Antonios (2009) who found that an incresae of bank lending by 1 per cent led to an increase of economic growth by 0.14 per cent in Greece. The study suggested the creation of modern financial institutions which are a response to the demand for new innovative products by investors and savers in the real economy.

Figure 4.1 (f) shows the response of GDP to changes in money supply (monetary policy stance). The findings show that the response of Money supply M2 to GDP is not significantly different from zero. The figure shows that GDP responds positively to shocks from money supply M2. In other words, that an expansionary monetary policy leads to an increase in the level of economic activity and economic growth. This is consistent with theoretical expectations. This means that an expansionary monetary policy increases the amount of money available for commercial banks to issue as loans to the private sector and when these loans are channeled towards invesment ventures, it leads to economic growth. These findings are consistent with those of Ogunmuyiwa and Ekone (2010) who

conclude that aggregate money supply is positively related to economic growth and development.

In conclusion, the impulse response graphs show that monetary policy affects economic growth in Kenya. However, the response of lending rates to monetary policy changes are too sluggish and need CBK's attention. In addition, it seem like loan demand is inelastic in Kenya and therefore an increase in lending rates do not reduce loan demand as would be anticipated. This also calls for attention of the CBK since monetary policy efffects cannot effectively be transmitted to the aggregate economy with inelastic demand for loans.

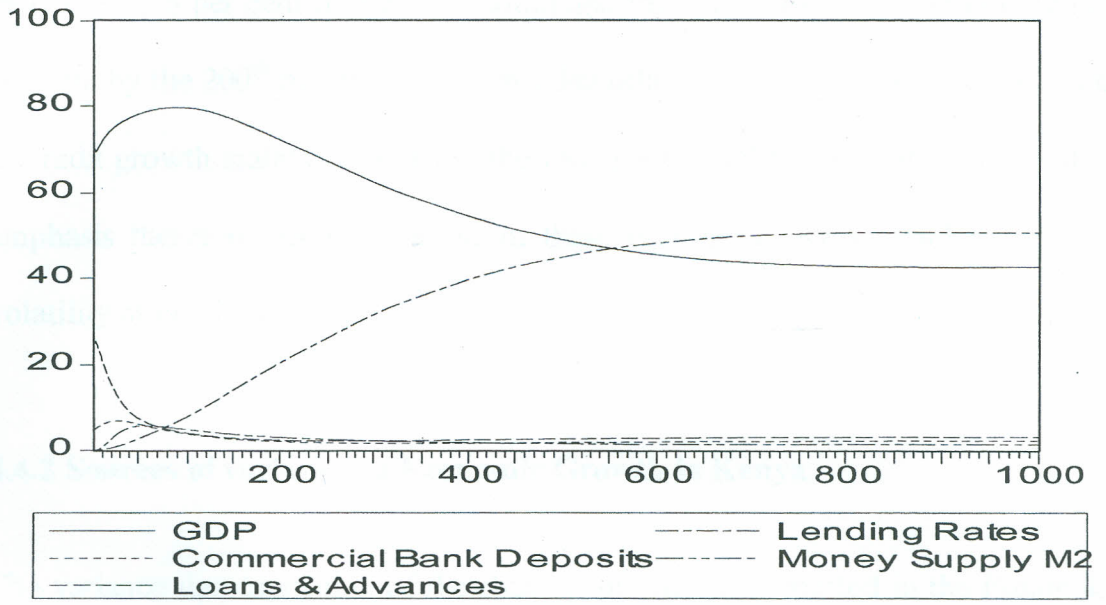
4.4 Sources of variation in Credit Growth and Economic Growth in Kenya

In this section, we attempt to address the third ojective to determine what accounts for the variations in credit growth and GDP growth.

4.4.1 Sources of variation in Credit Growth in Kenya

The figure 4.2 below gives the variance decomposition of the variations in credit growth.

Figure 4.2 Sources of Credit Growth variations in Kenya



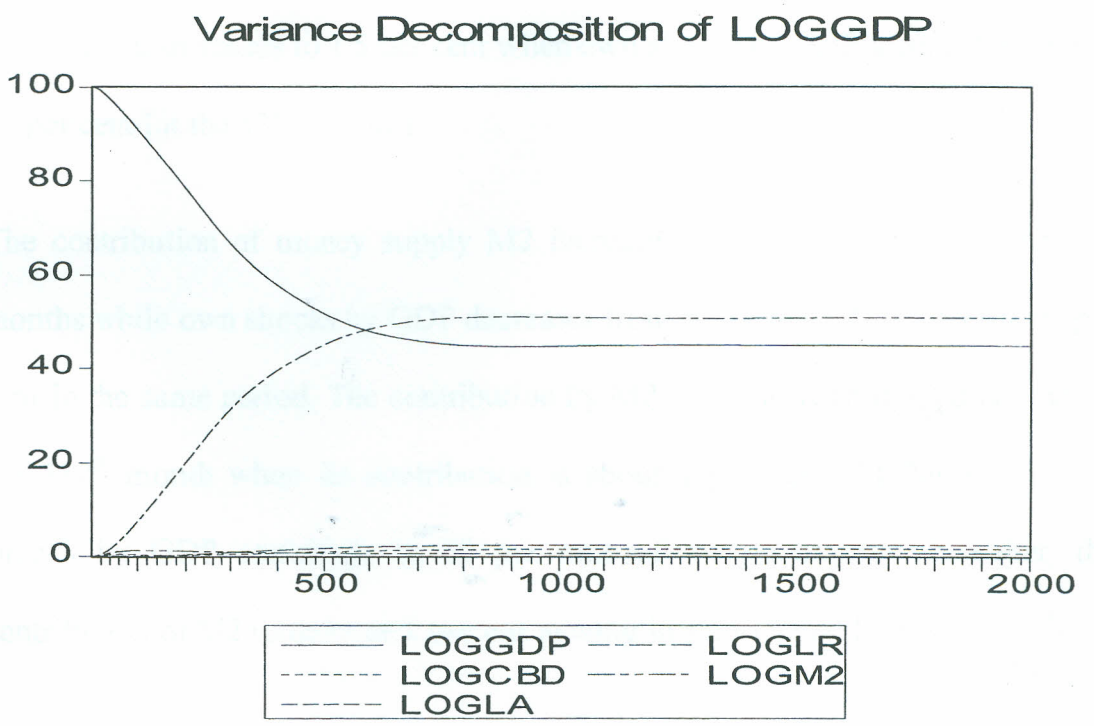
The figure shows that own shocks account for 25 per cent of the variations in credit growth in the first month. This contribution reduces very fast within the first 40 months and thereafter reduces gradually to less than 2 per cent. The contribution of GDP to variations in credit growth is at 70 per cent in the first month and it increases to 80 per cent before decreasing gradually to about 40 per cent with time. The contribution of lending rate to variations in credit growth is at zero per cent in the first month and it starts growing immediately so that by the 750th month, its contribution to variations in credit growth is 50 per cent. It thereafter stagnates at the same level of contribition. Money supply M2 has 0 per cent contribution of variations in credit growth in the first month and this contribution increases to 5 percent at the 40th month and thereafter decressing gradually to 2 per cent by the 300th month. Commercial Bank Deposits contribute

5 per cent of the variations in credit growth in the first month. This contribution increases to 6 per cent in the 10th month and thereafter decressing gradually to 2 per cent by the 200th month. This shows that other than own shocks, the variations in credit growth mainly come from the changes in lending rates and GDP. More emphasis therefore need to be put in these two variables to avoid too violent volatility of credit growth.

4.4.2 Sources of variation in Economic Growth in Kenya

The variance decomposition of the changes in GDP are reported in the Figure 4.3 below:

Figure 4.3: Sources of GDP variations in Kenya



The variance decomposition graphs largely confirm the results obtained in the impulse response analysis. Own shocks account for 100 per cent of the variations in GDP in the first month. This contribution reduces gradually as the other variables account for an increasing percentage of the variations in GDP. In the 30th month, the contribution of own shocks reduce to 95 per cent while the contribution of lending rates increases to 3 percent. The contribution of own shocks keeps decreasing as that of lending rates increases and by the 580th month, both GDP and lending rates contribute 50 per cent of the variations in GDP. This trend continues and at 800th month, the contribution of own shocks is at 45 percent while that of lending rates is at 55 per cent and thereafter the graphs move in their original path.

The contribution of Commercial Bank Deposits (CBD) and Loans and Advances (LA) graudually increases as the own shocks by GDP decreases. CBD's contribution increases to 1.5 per cent when own shocks by GDP's contribition is at 50 per cent (at the 520th month).

The contribution of money supply M2 increases to 1.5 per cent in the first 60 months while own shocks by GDP decreases from the initial 100 per cent to 95 per cent in the same period. The contribution by M2 starts decreasing gradually up to the 380th month when its contribution is about 1 per cent. At this point, own shocks by GDP contribute to 60 per cent of the variations. Thereafter, the contribution of M2 remains at 1 percent moving in a horizontal line.

The variance decomposition graphs are used to address objective three of establishing how shocks in credit affect GDP growth. The results show that other than own shocks, changes in lending rates account for the largest variations in GDP followed by changes in loans and advances and the commercial bank deposits. The least contribution comes from changes in money supply.

4.5 Cointegration tests

After conducting the unit root tests, co-integration test was done to determine whether there was a long run relationship between the non-stationary variables. Cointegration test will help in determining whether credit growth and economic growth has a long run relationship.

Inference on the number of cointegrating relations is done using two statistics known as the trace statistic and the maximum eigenvalue statistic. The trace statistic is determined using the following formula;

$$\lambda_{trace} = -T \sum_{i=r+1}^{n} \log(1-\lambda_i) \quad \text{.....(4.1)}$$

where r = 0, 1, 2, … , n-1, T = number of observations and λ_i = the i^{th} eigenvalue.

The maximum eigenvalue statistic is determined using the following formula:

$$\lambda_{\max} = -T \log(1-\lambda_{r+1}) \quad \text{.....(4.2)}$$

where r = 0, 1, 2, … , n-1

To make inferences regarding the number of cointegrating relationships, the trace and maximum eigenvalue statistics are compared with the critical values as shown in table 4.3 below;

Table 4.3 Trace Cointegration tests

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.727318	82.30227	68.52	76.07	None **
0.459117	35.52217	47.21	54.46	At most 1
0.196317	13.39826	29.68	35.65	At most 2
0.076004	5.530455	15.41	20.04	At most 3
0.071864	2.684759	3.76	6.65	At most 4

*(**) denotes rejection of the hypothesis at 5% (1%) significance level .

The results shown in table table 4.3 above shows that there exists cointegrating relation between credit growth and economic growth. This means that the variables are cointegrated and therefore there exists a long-run relationship between credit growth and economic growth. This result shows that even though credit growth deviates so much from the long run trend, it still straces economic growth and therefore using monetary policy to target credit growth with the aim of influencing the direction of economic growth is still beneficial in the long run. The

long-run relationship of the cointegrated variables is given as

$$\log GDP_t = 0.7758 + 0.0617 \log CBD_t + 0.0991 \log LA_t + 0.0693 \log LR_t + 0.8087 \log M2_t \quad ..(4.3)$$

The results show that for all the variables, there is a long run positive relationship between credit growth and economic growth. This implies that an expansionary monetary policy will lead to an increase in economic growth even if credit growth tends to deviate too much away from the long-run trend in the short run . After estimating the long-run relationship between the variables, a reduced form VAR was then estimated to generate the impulse response functions and graphs to be used in the analysis. The VAR model was estimated with all the I(1) variables in their first difference to correct for non-stationarity in the series.

CHAPTER FIVE

SUMMARY, CONCLUSION AND POLICY RECOMMENDATIONS

5.1 Introduction

This section consists of summary and conclusions and policy recommendations stemming from the section on data analysis.

5.2 Summary and conclusions

The study sought to establish whether monetary policy impacts credit growth and economic growth in Kenya. It was hypothesised in this study that monetary policy do not affect credit growth and that there is no long run relationship among credit growth and economic growth in Kenya. It was observed that lending rates do not seem to respond to monetary policy changes as is expected. Moreover, economic growth do not seem to trace the changes in credit growth while credit growth trends are very volatile. It was then hypothesised that credit growth and economic growth have no long run relationship in the long run and therefore any monetary efforts to stimulate credit growth in order to increaseeconomic growth are only futile. Using data between 1971 and 2008 and Vector Autoregression (VAR) model, it was found that, even though credit growth deviates so much from the long run trend, it still traces economic growth and therefore using monetary policy to target credit growth with the aim of influencing the direction of economic growth is still beneficial in the long run. The results show that for all the variables,

there is a long run positive relationship between credit growth and economic growth. This implies that an expansionary monetary policy will lead to an increase in economic growth even if credit growth tends to deviate too much away from the long-run trend in the short run .

The results further show that loans and advances will increase if there is a positive shock in the lending rates. This finding is contrary to expectations. This positive impact could imply that loan demand in Kenya is inelastic. The inelasticity of demand for loans in Kenya as implied by these findings should be a major concern for the CBK because if loan demand is inelastic, no monetary policy changes will affect credit growth. The findings further show that, other than own shocks, the variations in credit growth mainly come from the changes in lending rates and GDP. More emphasis therefore need to be put in these two variables to avoid too violent volatility of credit growth.

5.3 Policy Recommendations

Following the findings of other studies similar to this study, below are the policy recommendations arising from this study;

- The finding that loan demand is inelastic in Kenya should be a major concern for the CBK because if loan demand is inelastic, no monetary policy changes will affect credit growth. There is need to look at the factors that affect the demand for loans in order to make the demand elastic to

changes in the lending rates. This will therefore make monetary policy changes be more effective in affecting economic growth.

- The finding that the response of lending rates to changes in Monetary policy is sluggish also need to be addressed. The monetary authorities need to establish why the response of these variables is sluggish in order to make monetary policy more effective. One of the possible reasons is the existence of inelastic demand for loans which makes the price for loans (lending rates) non-responsive to changes in monetary policy. This therefore calls for the CBK to adress the inelastic demand for loans in Kenya.
- Given that credit growth positively affects economic growth in Kenya, the government should undertake essential policy measures to improve access to credit in order to achieve even higher levels of economic growth. These measures could include lowering the CBR and CRR further.

5.4 Suggestions for Further Research

This study was limited to the relationship between monetary policy, credit growth and economic growth. This leaves some further research and in particular there is need to determine how monetary policy affects economic growth through the other channels of the monetary policy transmission mechanism so that the full impact of monetary policy changes can be realized.

REFERENCES

Allen, D.S. and L. Ndikumana (1998). "Financial Intermediation and Economic Growth in Southern Africa," Working Paper Series 1998-004, The Federal Reserve Bank of ST. Louis.

Arellano, M. and Bover, O. (1995). "Another look at the Insrumental Variable Estimation of Error Component Models," *Journal of Econometrics* vol. 68, pp. 29-51.

Athanasios, V. and Antonios, A. (2009). "Financial Development and Economic Growth, An Epirical Analysis for Greece," *American Journal of Applied Sciences,* vol 6(7), pp 1410-1417.

Beck, T., Demirguc-Kunt, A. and Levine, R. (2005). "Bank Supervision and Corruption in Lending," NBER Working Paper No. 11498.

Bernanke, B.S and Blinder, A. (1988). "Credit, Money and Aggregate Demand," *American Economic Review*, Vol. 82, pp. 901-921.

Blundell, R. and Bond, S. (1998). "GMM Estimation with Persistent Panel Data: An Application to Production Function." The Institute for Fiscal Studies Working Paper Series No. W99/4.

Boyreau-Debray, G. (2003). "Financial Intermediation and Growth – Chinese Style." Policy Research Working Paper 3027, The World Bank.

Calderon, C. and Liu, L. (2003). "The direction of Causality between Financial Development and Economic Growth." *Journal of Development Economics.*

Central Bank of Kenya - CBK (Jan 2010), *Monthly Economic Review*, Government Printers, Nairobi.

Choe, C. and Moosa, I.A. (1999). "Financial Ssytem and Economic Growth: The Korean Experience," World Development, vol. 27(6), pp. 1069-1082.

Christopoulos, D. and Tsionas E. (2004). "Financial Development and Economic Growth: Evidence from Panel Unit Root and Cointegration Tests," *Journal of Development Economics* vol. 73, pp. 55-74.

Crowley, J. (2008). "Credit Growth in the Middle EAST, North Africa and Central Asia Region," IMF Working Paper No. 08/184.

Davis, E. P. (2004). "Financial Development, Institutional Investors and Economic Performance," http://www.geocities.com/e_philip_davis, Accessed, January 2010.

De Gregorio, J. and Guidotti, P. E. (1995). "Financial Development and Economic Growth, World Development," vol. 23(3), pp. 433-448.

Demetriades, O. P. and Hussein, A. K. (1996). "Does Financial Development cause Economic Growth? Time Series evidence from 16 countries," *Journal of Development Economics*, vol. 51, Issue 2, pp. 387-411.

Demetriades ,P. and Andrianova, S. (2004). "Finance and Growth: What We Know and What We Need to Know," University of Leicester.

Demirguc-Kunt, A. and Levine, R. (2008). "Finance, Financial Sector Policies and Long Run Growth," The World Bank Development Research Group, Policy Research Working Paper 4469.

Domar, I. (1999). "The distributional consequences of Monetary Policy: Evidence from Malaysia," http://www.wb.cu.car.chula.ac.th/papers/wordbank/wps 2170.pdf, Accessed November 2009.

Eita, J.H., (2007). "A causality Analysis between Financial Development and Economic Growth for Botswana," http://www.up.ac.za/up/web/en/academic/economics/index.html, Accessed November 2009.

Fase, M. M. G. and Abma, R. C. N. (2003). "Financial Environment and Economic Growth in Selected Asian Countries," *Journal of Asian Economics*, vol. 14, pp. 11-21.

Favara, G. (2003). "An Empirical Reassessment of the Relationship between Finance and Growth," IMF Working Paper No. 03/123.

Friedman, M. and Schwartz, A (1963). "Monetary history of the United States." 1st Edn. Princeton University Press, Princeton.

Fry, M. J. (1988). Money, Interest and Banking in Economic Development, John Hopkins University Press, London.

Ghali, K.H. (1999). "Financial Development and Economic Growth: The Tunisian experience," *Review of Development Economics*, vol. 3(3), pp. 310-322.

Giovanni, F. and Kang, T.S. (1999). "The Credit Channel at Work: Lessons from the Republic of Korea's Financial Crisis," http://www.wb.cu.car.chula.ac.th/papers/worldbank/wps 2190.pdf, Accessed November 2009.

Goldsmith, R. W. (1969). "Financial Structure and Development," Yale University Press, New Haven, Ct.

Gross, M. D. (2001). "Financial Intermediation: A Contributing Factor to Economic Growth and Employment," Social Finance, Working Paper No. 27.

Gurley, J. and Shaw, E. (1967). "Financial Structure and Economic Development, *Economic Development and Cultural Change*," Vol. 15(3), pp. 257-268.

Habibullah, M. S. and Eng Yoke-kee (2006). "Does Financial Development Cause Economic Growth? A Panel Data Dynamic Analysis for the Asian Developing Countries," *Journal of the Asia Pacific Economy*, Vol. 11(4), pp. 377 – 393.

Ho, N.W., (2002). "Finance and Growth: The Case of Macao," pp 42-62, http://www.amcm.gov.mo/publication/quarterly/Jan/Finance_EN.pdf, Accessed October 2009.

IMF, (2008). "Global Financial Stability Report," IMF Publication, Autumn.

Kim, H.E. (1999). "Was Credit Channel a Key Monetary Transmission Mechanism Following the Recent Financial Crisis in the Republic of Korea?" Policy Research Working Paper 3003, World Bank.

King, R. G. and Levine, R. (1993). "Finance, Entrepreneurship, and Growth: Theory and Evidence," *Journal of Monetary Economics*, vol. 32, pp. 513-542.

Levine, R. (2002). "Bank-Based or Market-Based Financial Systems: Which is Better?" *Journal of Financial Intermediation*, vol. 11, pp. 398–428.

Levine, R. Loayza, N. and Beck, T. (2000). "Financial Intermediation and Economic Growth: Causes and Causality," *Journal of Monetary Economics*, vol. 46, pp. 31-77.

Loayza, N. and Ranciere, R. (2004). "Financial Development, Financial Fragility and Growth, CREI (Centre de Recherche en Economie Internationale)" Working Papers, WPS 3431.

Lucas, R. (1988). "On the Mechanics of Economic Development. *Journal of Monetary Economics,*" vol. 22, pp. 2-42.

McKinnon, R., (1973). Money and Capital in Economic Development, 1st Edn., Washington, DC, Brookings Institution, pp 200.

Mishra, P.K., Das, K.B. and Pradhan B.B. (2009). "Credit Market Development and Economic Growth in India," *JEL Classification Code: C13, C22, C32, E51, G19, O16.*

Muhsin, K. and Eric, J. P. (2000). "Financial Development and Economic Growth in Turkey: Further Evidence on the Causality Issue," Centre for International, Financial and Economics Research Department of Economics, Loughborough University.

Odedokun, M.O. (1998). "Causalities between Financial Aggregates and Economic Activities: The Results from Granger's Test," Savings and Development, vol.23(1), pp. 101- 111.

Odhiambo, N.M. (2005). "Financial Development and Economic Growth in Tanzania: A Dynamic Causality Test," *African Finance Journal,* vol. 7(1), pp. 1-17.

Ogunmuyiwa, M.S. and Ekone, A.F. (2010). "Money Supply-Economic Growth Nexus in Nigeria" *Journal of Social Science,* vol. 22(3), pp 199-204.

Oura, H. (2008). "Financial Development and Growth in India: A Growing Tiger in a Cage?" IMF Working paper 08/79.

Republic of Kenya, Economic Surveys, (1998-2009).

Robinson, J. (1952). "The Generalization of the General Theory," In The Rate of Interest, and Other Essays, London: McMillan pp. 67–146.

Rufael, Y.W. (2009). "Re-examining the Financial Development and Economic Growth Nexus in Kenya" http://www.elsevier.com/locate/ecmod, Accessed December 2009.

Schumpeter, J.A. (1911). The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest and the Business Cycle, Translated and Reprinted 1961, New York, Oxford University Press.

Shan, J. and Jianhong, Q. (2006). "Does Financial Development lead Economic Growth? The case of China," *Annals of Economics and Finance* 1 pp. 231 – 250.

Shaw, E. S. (1973). "Financial Deepening in Economic Development," Oxford University Press, New York.

Sichei, M.M, Karingi, S.N and Ndung'u, N.S. (2004). "Monetary Policy Transmission Mechanisms in Kenya: A Structural VAR Search for the Credit Channel," The Kenya Institute of Public Policy Research and Analysis (KIPPRA), Unpublished Working paper.

Swiston, A. (2008). "A US Financial Conditions Index: Putting Credit where Credit is Due," IMF Working Paper, June 2008.

APPENDIX

Table A1: Monthly Data 1971:1 – 2008:12

OBSERVATION	LOG LA	LOG CBD	LOG GDP	LOG LR	LOG M2
1971:01	9.3028	9.4206	10.1087	0.9542	9.5573
1971:02	9.3028	9.4206	10.1087	0.9542	9.5573
1971:03	9.3028	9.4206	10.1087	0.9542	9.5573
1971:04	9.3028	9.4206	10.1087	0.9542	9.5573
1971:05	9.3028	9.4206	10.1087	0.9542	9.5573
1971:06	9.3028	9.4206	10.1087	0.9542	9.5573
1971:07	9.3028	9.4206	10.1087	0.9542	9.5573
1971:08	9.3028	9.4206	10.1087	0.9542	9.5573
1971:09	9.3028	9.4206	10.1087	0.9542	9.5573
1971:10	9.3028	9.4206	10.1087	0.9542	9.5573
1971:11	9.3028	9.4206	10.1087	0.9542	9.5573
1971:12	9.3028	9.4206	10.1087	0.9542	9.5573
1972:01	9.2996	9.4014	10.1391	0.9542	9.5926
1972:02	9.2996	9.4014	10.1391	0.9542	9.5926
1972:03	9.2996	9.4014	10.1391	0.9542	9.5926
1972:04	9.2996	9.4014	10.1391	0.9542	9.5926
1972:05	9.2996	9.4014	10.1391	0.9542	9.5926
1972:06	9.2996	9.4014	10.1391	0.9542	9.5926
1972:07	9.2996	9.4014	10.1391	0.9542	9.5926
1972:08	9.2996	9.4014	10.1391	0.9542	9.5926
1972:09	9.2996	9.4014	10.1391	0.9542	9.5926
1972:10	9.2996	9.4014	10.1391	0.9542	9.5926
1972:11	9.2996	9.4014	10.1391	0.9542	9.5926
1972:12	9.2996	9.4014	10.1391	0.9542	9.5926
1973:01	9.4171	9.5132	10.1984	0.9542	9.6863
1973:02	9.4171	9.5132	10.1984	0.9542	9.6863
1973:03	9.4171	9.5132	10.1984	0.9542	9.6863
1973:04	9.4171	9.5132	10.1984	0.9542	9.6863
1973:05	9.4171	9.5132	10.1984	0.9542	9.6863
1973:06	9.4171	9.5132	10.1984	0.9542	9.6863
1973:07	9.4171	9.5132	10.1984	0.9542	9.6863
1973:08	9.4171	9.5132	10.1984	0.9542	9.6863
1973:09	9.4171	9.5132	10.1984	0.9542	9.6863
1973:10	9.4171	9.5132	10.1984	0.9542	9.6863
1973:11	9.4171	9.5132	10.1984	0.9542	9.6863
1973:12	9.4171	9.5132	10.1984	0.9542	9.6863
1974:01	9.5525	9.4223	10.2736	0.9777	9.7530

1974:02	9.5525	9.4223	10.2736	0.9777	9.7530
1974:03	9.5525	9.4223	10.2736	0.9777	9.7530
1974:04	9.5525	9.4223	10.2736	0.9777	9.7530
1974:05	9.5525	9.4223	10.2736	0.9777	9.7530
1974:06	9.5525	9.4223	10.2736	0.9777	9.7530
1974:07	9.5525	9.4223	10.2736	0.9777	9.7530
1974:08	9.5525	9.4223	10.2736	0.9777	9.7530
1974:09	9.5525	9.4223	10.2736	0.9777	9.7530
1974:10	9.5525	9.4223	10.2736	0.9777	9.7530
1974:11	9.5525	9.4223	10.2736	0.9777	9.7530
1974:12	9.5525	9.4223	10.2736	0.9777	9.7530
1975:01	9.5960	9.6425	10.3251	1.0000	9.7901
1975:02	9.5960	9.6425	10.3251	1.0000	9.7901
1975:03	9.5960	9.6425	10.3251	1.0000	9.7901
1975:04	9.5960	9.6425	10.3251	1.0000	9.7901
1975:05	9.5960	9.6425	10.3251	1.0000	9.7901
1975:06	9.5960	9.6425	10.3251	1.0000	9.7901
1975:07	9.5960	9.6425	10.3251	1.0000	9.7901
1975:08	9.5960	9.6425	10.3251	1.0000	9.7901
1975:09	9.5960	9.6425	10.3251	1.0000	9.7901
1975:10	9.5960	9.6425	10.3251	1.0000	9.7901
1975:11	9.5960	9.6425	10.3251	1.0000	9.7901
1975:12	9.5960	9.6425	10.3251	1.0000	9.7901
1976:01	9.6563	9.7208	10.4076	1.0000	9.8847
1976:02	9.6563	9.7208	10.4076	1.0000	9.8847
1976:03	9.6563	9.7208	10.4076	1.0000	9.8847
1976:04	9.6563	9.7208	10.4076	1.0000	9.8847
1976:05	9.6563	9.7208	10.4076	1.0000	9.8847
1976:06	9.6563	9.7208	10.4076	1.0000	9.8847
1976:07	9.6563	9.7208	10.4076	1.0000	9.8847
1976:08	9.6563	9.7208	10.4076	1.0000	9.8847
1976:09	9.6563	9.7208	10.4076	1.0000	9.8847
1976:10	9.6563	9.7208	10.4076	1.0000	9.8847
1976:11	9.6563	9.7208	10.4076	1.0000	9.8847
1976:12	9.6563	9.7208	10.4076	1.0000	9.8847
1977:01	9.7951	9.8637	10.5145	1.0000	10.0442
1977:02	9.7951	9.8637	10.5145	1.0000	10.0442
1977:03	9.7951	9.8637	10.5145	1.0000	10.0442
1977:04	9.7951	9.8637	10.5145	1.0000	10.0442
1977:05	9.7951	9.8637	10.5145	1.0000	10.0442
1977:06	9.7951	9.8637	10.5145	1.0000	10.0442
1977:07	9.7951	9.8637	10.5145	1.0000	10.0442

1977:08	9.7951	9.8637	10.5145	1.0000	10.0442
1977:09	9.7951	9.8637	10.5145	1.0000	10.0442
1977:10	9.7951	9.8637	10.5145	1.0000	10.0442
1977:11	9.7951	9.8637	10.5145	1.0000	10.0442
1977:12	9.7951	9.8637	10.5145	1.0000	10.0442
1978:01	9.9104	9.9320	10.5515	1.0000	10.1224
1978:02	9.9104	9.9320	10.5515	1.0000	10.1224
1978:03	9.9104	9.9320	10.5515	1.0000	10.1224
1978:04	9.9104	9.9320	10.5515	1.0000	10.1224
1978:05	9.9104	9.9320	10.5515	1.0000	10.1224
1978:06	9.9104	9.9320	10.5515	1.0000	10.1224
1978:07	9.9104	9.9320	10.5515	1.0000	10.1224
1978:08	9.9104	9.9320	10.5515	1.0000	10.1224
1978:09	9.9104	9.9320	10.5515	1.0000	10.1224
1978:10	9.9104	9.9320	10.5515	1.0000	10.1224
1978:11	9.9104	9.9320	10.5515	1.0000	10.1224
1978:12	9.9104	9.9320	10.5515	1.0000	10.1224
1979:01	9.9877	9.9825	10.5971	1.0000	10.1713
1979:02	9.9877	9.9825	10.5971	1.0000	10.1713
1979:03	9.9877	9.9825	10.5971	1.0000	10.1713
1979:04	9.9877	9.9825	10.5971	1.0000	10.1713
1979:05	9.9877	9.9825	10.5971	1.0000	10.1713
1979:06	9.9877	9.9825	10.5971	1.0000	10.1713
1979:07	9.9877	9.9825	10.5971	1.0000	10.1713
1979:08	9.9877	9.9825	10.5971	1.0000	10.1713
1979:09	9.9877	9.9825	10.5971	1.0000	10.1713
1979:10	9.9877	9.9825	10.5971	1.0000	10.1713
1979:11	9.9877	9.9825	10.5971	1.0000	10.1713
1979:12	9.9877	9.9825	10.5971	1.0000	10.1713
1980:01	10.0472	9.9955	10.6498	1.0246	10.2187
1980:02	10.0472	9.9955	10.6498	1.0246	10.2187
1980:03	10.0472	9.9955	10.6498	1.0246	10.2187
1980:04	10.0472	9.9955	10.6498	1.0246	10.2187
1980:05	10.0472	9.9955	10.6498	1.0246	10.2187
1980:06	10.0472	9.9955	10.6498	1.0246	10.2187
1980:07	10.0472	9.9955	10.6498	1.0246	10.2187
1980:08	10.0472	9.9955	10.6498	1.0246	10.2187
1980:09	10.0472	9.9955	10.6498	1.0246	10.2187
1980:10	10.0472	9.9955	10.6498	1.0246	10.2187
1980:11	10.0472	9.9955	10.6498	1.0246	10.2187
1980:12	10.0472	9.9955	10.6498	1.0246	10.2187
1981:01	10.0768	10.0399	10.7130	1.0940	10.2495

1981:02	10.0768	10.0399	10.7130	1.0940	10.2495
1981:03	10.0768	10.0399	10.7130	1.0940	10.2495
1981:04	10.0768	10.0399	10.7130	1.0940	10.2495
1981:05	10.0768	10.0399	10.7130	1.0940	10.2495
1981:06	10.0768	10.0399	10.7130	1.0940	10.2495
1981:07	10.0768	10.0399	10.7130	1.0940	10.2495
1981:08	10.0768	10.0399	10.7130	1.0940	10.2495
1981:09	10.0768	10.0399	10.7130	1.0940	10.2495
1981:10	10.0768	10.0399	10.7130	1.0940	10.2495
1981:11	10.0768	10.0399	10.7130	1.0940	10.2495
1981:12	10.0768	10.0399	10.7130	1.0940	10.2495
1982:01	10.1262	10.0881	10.7650	1.1614	10.2885
1982:02	10.1262	10.0881	10.7650	1.1614	10.2885
1982:03	10.1262	10.0881	10.7650	1.1614	10.2885
1982:04	10.1262	10.0881	10.7650	1.1614	10.2885
1982:05	10.1262	10.0881	10.7650	1.1614	10.2885
1982:06	10.1262	10.0881	10.7650	1.1614	10.2885
1982:07	10.1262	10.0881	10.7650	1.1614	10.2885
1982:08	10.1262	10.0881	10.7650	1.1614	10.2885
1982:09	10.1262	10.0881	10.7650	1.1614	10.2885
1982:10	10.1262	10.0881	10.7650	1.1614	10.2885
1982:11	10.1262	10.0881	10.7650	1.1614	10.2885
1982:12	10.1262	10.0881	10.7650	1.1614	10.2885
1983:01	10.1540	10.1270	10.8210	1.1996	10.3288
1983:02	10.1540	10.1270	10.8210	1.1996	10.3288
1983:03	10.1540	10.1270	10.8210	1.1996	10.3288
1983:04	10.1540	10.1270	10.8210	1.1996	10.3288
1983:05	10.1540	10.1270	10.8210	1.1996	10.3288
1983:06	10.1540	10.1270	10.8210	1.1996	10.3288
1983:07	10.1540	10.1270	10.8210	1.1996	10.3288
1983:08	10.1540	10.1270	10.8210	1.1996	10.3288
1983:09	10.1540	10.1270	10.8210	1.1996	10.3288
1983:10	10.1540	10.1270	10.8210	1.1996	10.3288
1983:11	10.1540	10.1270	10.8210	1.1996	10.3288
1983:12	10.1540	10.1270	10.8210	1.1996	10.3288
1984:01	10.2021	10.1638	10.8606	1.1589	10.3733
1984:02	10.2021	10.1638	10.8606	1.1589	10.3733
1984:03	10.2021	10.1638	10.8606	1.1589	10.3733
1984:04	10.2021	10.1638	10.8606	1.1589	10.3733
1984:05	10.2021	10.1638	10.8606	1.1589	10.3733
1984:06	10.2021	10.1638	10.8606	1.1589	10.3733
1984:07	10.2021	10.1638	10.8606	1.1589	10.3733

1984:08	10.2021	10.1638	10.8606	1.1589	10.3733
1984:09	10.2021	10.1638	10.8606	1.1589	10.3733
1984:10	10.2021	10.1638	10.8606	1.1589	10.3733
1984:11	10.2021	10.1638	10.8606	1.1589	10.3733
1984:12	10.2021	10.1638	10.8606	1.1589	10.3733
1985:01	10.2606	10.2117	11.0036	1.1461	10.4211
1985:02	10.2606	10.2117	11.0036	1.1461	10.4211
1985:03	10.2606	10.2117	11.0036	1.1461	10.4211
1985:04	10.2606	10.2117	11.0036	1.1461	10.4211
1985:05	10.2606	10.2117	11.0036	1.1461	10.4211
1985:06	10.2606	10.2117	11.0036	1.1461	10.4211
1985:07	10.2606	10.2117	11.0036	1.1461	10.4211
1985:08	10.2606	10.2117	11.0036	1.1461	10.4211
1985:09	10.2606	10.2117	11.0036	1.1461	10.4211
1985:10	10.2606	10.2117	11.0036	1.1461	10.4211
1985:11	10.2606	10.2117	11.0036	1.1461	10.4211
1985:12	10.2606	10.2117	11.0036	1.1461	10.4211
1986:01	10.3284	10.2735	11.0699	1.1461	10.5147
1986:02	10.3284	10.2735	11.0699	1.1461	10.5147
1986:03	10.3284	10.2735	11.0699	1.1461	10.5147
1986:04	10.3284	10.2735	11.0699	1.1461	10.5147
1986:05	10.3284	10.2735	11.0699	1.1461	10.5147
1986:06	10.3284	10.2735	11.0699	1.1461	10.5147
1986:07	10.3284	10.2735	11.0699	1.1461	10.5147
1986:08	10.3284	10.2735	11.0699	1.1461	10.5147
1986:09	10.3284	10.2735	11.0699	1.1461	10.5147
1986:10	10.3284	10.2735	11.0699	1.1461	10.5147
1986:11	10.3284	10.2735	11.0699	1.1461	10.5147
1986:12	10.3284	10.2735	11.0699	1.1461	10.5147
1987:01	10.3711	10.3030	11.1178	1.1461	10.6098
1987:02	10.3711	10.3030	11.1178	1.1461	10.6098
1987:03	10.3711	10.3030	11.1178	1.1461	10.6098
1987:04	10.3711	10.3030	11.1178	1.1461	10.6098
1987:05	10.3711	10.3030	11.1178	1.1461	10.6098
1987:06	10.3711	10.3030	11.1178	1.1461	10.6098
1987:07	10.3711	10.3030	11.1178	1.1461	10.6098
1987:08	10.3711	10.3030	11.1178	1.1461	10.6098
1987:09	10.3711	10.3030	11.1178	1.1461	10.6098
1987:10	10.3711	10.3030	11.1178	1.1461	10.6098
1987:11	10.3711	10.3030	11.1178	1.1461	10.6098
1987:12	10.3711	10.3030	11.1178	1.1461	10.6098
1988:01	10.4368	10.3861	11.1795	1.1761	10.5910

1988:02	10.4368	10.3861	11.1795	1.1761	10.5910
1988:03	10.4368	10.3861	11.1795	1.1761	10.5910
1988:04	10.4368	10.3861	11.1795	1.1761	10.5910
1988:05	10.4368	10.3861	11.1795	1.1761	10.5910
1988:06	10.4368	10.3861	11.1795	1.1761	10.5910
1988:07	10.4368	10.3861	11.1795	1.1761	10.5910
1988:08	10.4368	10.3861	11.1795	1.1761	10.5910
1988:09	10.4368	10.3861	11.1795	1.1761	10.5910
1988:10	10.4368	10.3861	11.1795	1.1761	10.5910
1988:11	10.4368	10.3861	11.1795	1.1761	10.5910
1988:12	10.4368	10.3861	11.1795	1.1761	10.5910
1989:01	10.5111	10.4489	11.2345	1.2368	10.6833
1989:02	10.5111	10.4489	11.2345	1.2368	10.6833
1989:03	10.5111	10.4489	11.2345	1.2368	10.6833
1989:04	10.5111	10.4489	11.2345	1.2368	10.6833
1989:05	10.5111	10.4489	11.2345	1.2368	10.6833
1989:06	10.5111	10.4489	11.2345	1.2368	10.6833
1989:07	10.5111	10.4489	11.2345	1.2368	10.6833
1989:08	10.5111	10.4489	11.2345	1.2368	10.6833
1989:09	10.5111	10.4489	11.2345	1.2368	10.6833
1989:10	10.5111	10.4489	11.2345	1.2368	10.6833
1989:11	10.5111	10.4489	11.2345	1.2368	10.6833
1989:12	10.5111	10.4489	11.2345	1.2368	10.6833
1990:01	10.5552	10.4724	11.2912	1.2730	10.7450
1990:02	10.5552	10.4724	11.2912	1.2730	10.7450
1990:03	10.5552	10.4724	11.2912	1.2730	10.7450
1990:04	10.5552	10.4724	11.2912	1.2730	10.7450
1990:05	10.5552	10.4724	11.2912	1.2730	10.7450
1990:06	10.5552	10.4724	11.2912	1.2730	10.7450
1990:07	10.5552	10.4724	11.2912	1.2730	10.7450
1990:08	10.5552	10.4724	11.2912	1.2730	10.7450
1990:09	10.5552	10.4724	11.2912	1.2730	10.7450
1990:10	10.5552	10.4724	11.2912	1.2730	10.7450
1990:11	10.5552	10.4724	11.2912	1.2730	10.7450
1990:12	10.5552	10.4724	11.2912	1.2730	10.7450
1991:01	10.6517	10.6347	11.3507	1.4624	10.8194
1991:02	10.6517	10.6347	11.3507	1.4624	10.8194
1991:03	10.6517	10.6347	11.3507	1.4624	10.8194
1991:04	10.6517	10.6347	11.3507	1.4624	10.8194
1991:05	10.6517	10.6347	11.3507	1.4624	10.8194
1991:06	10.6517	10.6347	11.3507	1.4624	10.8194
1991:07	10.6517	10.6347	11.3507	1.4624	10.8194

1991:08	10.6517	10.6347	11.3507	1.4624	10.8194
1991:09	10.6517	10.6347	11.3507	1.4624	10.8194
1991:10	10.6517	10.6347	11.3507	1.4624	10.8194
1991:11	10.6517	10.6347	11.3507	1.4624	10.8194
1991:12	10.6517	10.6347	11.3507	1.4624	10.8194
1992:01	10.7589	10.7014	11.4224	1.4771	10.9190
1992:02	10.7589	10.7014	11.4224	1.4771	10.9190
1992:03	10.7589	10.7014	11.4224	1.4771	10.9190
1992:04	10.7589	10.7014	11.4224	1.4771	10.9190
1992:05	10.7589	10.7014	11.4224	1.4771	10.9190
1992:06	10.7589	10.7014	11.4224	1.4771	10.9190
1992:07	10.7589	10.7014	11.4224	1.4771	10.9190
1992:08	10.7589	10.7014	11.4224	1.4771	10.9190
1992:09	10.7589	10.7014	11.4224	1.4771	10.9190
1992:10	10.7589	10.7014	11.4224	1.4771	10.9190
1992:11	10.7589	10.7014	11.4224	1.4771	10.9190
1992:12	10.7589	10.7014	11.4224	1.4771	10.9190
1993:01	10.7797	10.7014	11.5232	1.4770	11.0357
1993:02	10.7797	10.7014	11.5232	1.4770	11.0357
1993:03	10.7797	10.7014	11.5232	1.4770	11.0357
1993:04	10.7797	10.7014	11.5232	1.4770	11.0357
1993:05	10.7797	10.7014	11.5232	1.4770	11.0357
1993:06	10.7797	10.7014	11.5232	1.4770	11.0357
1993:07	10.7797	10.7014	11.5232	1.4770	11.0357
1993:08	10.7797	10.7014	11.5232	1.4770	11.0357
1993:09	10.7797	10.7014	11.5232	1.4770	11.0357
1993:10	10.7797	10.7014	11.5232	1.4770	11.0357
1993:11	10.7797	10.7014	11.5232	1.4770	11.0357
1993:12	10.7797	10.7014	11.5232	1.4770	11.0357
1994:01	10.9076	10.8070	11.6028	1.5592	11.1359
1994:02	10.9076	10.8070	11.6028	1.5592	11.1359
1994:03	10.9076	10.8070	11.6028	1.5592	11.1359
1994:04	10.9076	10.8070	11.6028	1.5592	11.1359
1994:05	10.9076	10.8070	11.6028	1.5592	11.1359
1994:06	10.9076	10.8070	11.6028	1.5592	11.1359
1994:07	10.9076	10.8070	11.6028	1.5592	11.1359
1994:08	10.9076	10.8070	11.6028	1.5592	11.1359
1994:09	10.9076	10.8070	11.6028	1.5592	11.1359
1994:10	10.9076	10.8070	11.6028	1.5592	11.1359
1994:11	10.9076	10.8070	11.6028	1.5592	11.1359
1994:12	10.9076	10.8070	11.6028	1.5592	11.1359
1995:01	11.0782	10.9669	11.6681	1.5204	11.2293

1995:02	11.0782	10.9669	11.6681	1.5204	11.2293
1995:03	11.0782	10.9669	11.6681	1.5204	11.2293
1995:04	11.0782	10.9669	11.6681	1.5204	11.2293
1995:05	11.0782	10.9669	11.6681	1.5204	11.2293
1995:06	11.0782	10.9669	11.6681	1.5204	11.2293
1995:07	11.0782	10.9669	11.6681	1.5204	11.2293
1995:08	11.0782	10.9669	11.6681	1.5204	11.2293
1995:09	11.0782	10.9669	11.6681	1.5204	11.2293
1995:10	11.0782	10.9669	11.6681	1.5204	11.2293
1995:11	11.0782	10.9669	11.6681	1.5204	11.2293
1995:12	11.0782	10.9669	11.6681	1.5204	11.2293
1996:01	11.1766	11.0844	11.8376	1.5287	11.3028
1996:02	11.1766	11.0844	11.8376	1.5287	11.3028
1996:03	11.1766	11.0844	11.8376	1.5287	11.3028
1996:04	11.1766	11.0844	11.8376	1.5287	11.3028
1996:05	11.1766	11.0844	11.8376	1.5287	11.3028
1996:06	11.1766	11.0844	11.8376	1.5287	11.3028
1996:07	11.1766	11.0844	11.8376	1.5287	11.3028
1996:08	11.1766	11.0844	11.8376	1.5287	11.3028
1996:09	11.1766	11.0844	11.8376	1.5287	11.3028
1996:10	11.1766	11.0844	11.8376	1.5287	11.3028
1996:11	11.1766	11.0844	11.8376	1.5287	11.3028
1996:12	11.1766	11.0844	11.8376	1.5287	11.3028
1997:01	11.2486	11.2003	11.8867	1.4807	11.3774
1997:02	11.2486	11.2003	11.8867	1.4807	11.3774
1997:03	11.2486	11.2003	11.8867	1.4807	11.3774
1997:04	11.2486	11.2003	11.8867	1.4807	11.3774
1997:05	11.2486	11.2003	11.8867	1.4807	11.3774
1997:06	11.2486	11.2003	11.8867	1.4807	11.3774
1997:07	11.2486	11.2003	11.8867	1.4807	11.3774
1997:08	11.2486	11.2003	11.8867	1.4807	11.3774
1997:09	11.2486	11.2003	11.8867	1.4807	11.3774
1997:10	11.2486	11.2003	11.8867	1.4807	11.3774
1997:11	11.2486	11.2003	11.8867	1.4807	11.3774
1997:12	11.2486	11.2003	11.8867	1.4807	11.3774
1998:01	11.2918	11.2010	11.9298	1.4176	11.4429
1998:02	11.2918	11.2010	11.9298	1.4176	11.4429
1998:03	11.2918	11.2010	11.9298	1.4176	11.4429
1998:04	11.2918	11.2010	11.9298	1.4176	11.4429
1998:05	11.2918	11.2010	11.9298	1.4176	11.4429
1998:06	11.2918	11.2010	11.9298	1.4176	11.4429
1998:07	11.2918	11.2010	11.9298	1.4176	11.4429

1998:08	11.2918	11.2010	11.9298	1.4176	11.4429
1998:09	11.2918	11.2010	11.9298	1.4176	11.4429
1998:10	11.2918	11.2010	11.9298	1.4176	11.4429
1998:11	11.2918	11.2010	11.9298	1.4176	11.4429
1998:12	11.2918	11.2010	11.9298	1.4176	11.4429
1999:01	11.3330	11.2258	11.9576	1.3499	11.4629
1999:02	11.3330	11.2258	11.9576	1.3499	11.4629
1999:03	11.3330	11.2258	11.9576	1.3499	11.4629
1999:04	11.3330	11.2258	11.9576	1.3499	11.4629
1999:05	11.3330	11.2258	11.9576	1.3499	11.4629
1999:06	11.3330	11.2258	11.9576	1.3499	11.4629
1999:07	11.3330	11.2258	11.9576	1.3499	11.4629
1999:08	11.3330	11.2258	11.9576	1.3499	11.4629
1999:09	11.3330	11.2258	11.9576	1.3499	11.4629
1999:10	11.3330	11.2258	11.9576	1.3499	11.4629
1999:11	11.3330	11.2258	11.9576	1.3499	11.4629
1999:12	11.3330	11.2258	11.9576	1.3499	11.4629
2000:01	11.3519	11.2284	11.9858	1.3491	11.4665
2000:02	11.3519	11.2284	11.9858	1.3491	11.4665
2000:03	11.3519	11.2284	11.9858	1.3491	11.4665
2000:04	11.3519	11.2284	11.9858	1.3491	11.4665
2000:05	11.3519	11.2284	11.9858	1.3491	11.4665
2000:06	11.3519	11.2284	11.9858	1.3491	11.4665
2000:07	11.3519	11.2284	11.9858	1.3491	11.4665
2000:08	11.3519	11.2284	11.9858	1.3491	11.4665
2000:09	11.3519	11.2284	11.9858	1.3491	11.4665
2000:10	11.3519	11.2284	11.9858	1.3491	11.4665
2000:11	11.3519	11.2284	11.9858	1.3491	11.4665
2000:12	11.3519	11.2284	11.9858	1.3491	11.4665
2001:01	11.3167	11.2176	12.0086	1.2937	11.5083
2001:02	11.3167	11.2176	12.0086	1.2937	11.5083
2001:03	11.3167	11.2176	12.0086	1.2937	11.5083
2001:04	11.3167	11.2176	12.0086	1.2937	11.5083
2001:05	11.3167	11.2176	12.0086	1.2937	11.5083
2001:06	11.3167	11.2176	12.0086	1.2937	11.5083
2001:07	11.3167	11.2176	12.0086	1.2937	11.5083
2001:08	11.3167	11.2176	12.0086	1.2937	11.5083
2001:09	11.3167	11.2176	12.0086	1.2937	11.5083
2001:10	11.3167	11.2176	12.0086	1.2937	11.5083
2001:11	11.3167	11.2176	12.0086	1.2937	11.5083
2001:12	11.3167	11.2176	12.0086	1.2937	11.5083
2002:01	11.3341	11.2723	12.0151	1.2661	11.5450

2002:02	11.3341	11.2723	12.0151	1.2661	11.5450
2002:03	11.3341	11.2723	12.0151	1.2661	11.5450
2002:04	11.3341	11.2723	12.0151	1.2661	11.5450
2002:05	11.3341	11.2723	12.0151	1.2661	11.5450
2002:06	11.3341	11.2723	12.0151	1.2661	11.5450
2002:07	11.3341	11.2723	12.0151	1.2661	11.5450
2002:08	11.3341	11.2723	12.0151	1.2661	11.5450
2002:09	11.3341	11.2723	12.0151	1.2661	11.5450
2002:10	11.3341	11.2723	12.0151	1.2661	11.5450
2002:11	11.3341	11.2723	12.0151	1.2661	11.5450
2002:12	11.3341	11.2723	12.0151	1.2661	11.5450
2003:01	11.3410	11.2837	12.0562	1.2194	11.5967
2003:02	11.3410	11.2837	12.0562	1.2194	11.5967
2003:03	11.3410	11.2837	12.0562	1.2194	11.5967
2003:04	11.3410	11.2837	12.0562	1.2194	11.5967
2003:05	11.3410	11.2837	12.0562	1.2194	11.5967
2003:06	11.3410	11.2837	12.0562	1.2194	11.5967
2003:07	11.3410	11.2837	12.0562	1.2194	11.5967
2003:08	11.3410	11.2837	12.0562	1.2194	11.5967
2003:09	11.3410	11.2837	12.0562	1.2194	11.5967
2003:10	11.3410	11.2837	12.0562	1.2194	11.5967
2003:11	11.3410	11.2837	12.0562	1.2194	11.5967
2003:12	11.3410	11.2837	12.0562	1.2194	11.5967
2004:01	11.3960	11.3881	12.1053	1.0881	11.6361
2004:02	11.3960	11.3881	12.1053	1.0881	11.6361
2004:03	11.3960	11.3881	12.1053	1.0881	11.6361
2004:04	11.3960	11.3881	12.1053	1.0881	11.6361
2004:05	11.3960	11.3881	12.1053	1.0881	11.6361
2004:06	11.3960	11.3881	12.1053	1.0881	11.6361
2004:07	11.3960	11.3881	12.1053	1.0881	11.6361
2004:08	11.3960	11.3881	12.1053	1.0881	11.6361
2004:09	11.3960	11.3881	12.1053	1.0881	11.6361
2004:10	11.3960	11.3881	12.1053	1.0881	11.6361
2004:11	11.3960	11.3881	12.1053	1.0881	11.6361
2004:12	11.3960	11.3881	12.1053	1.0881	11.6361
2005:01	11.4764	11.4449	12.1510	1.1193	11.6766
2005:02	11.4764	11.4449	12.1510	1.1193	11.6766
2005:03	11.4764	11.4449	12.1510	1.1193	11.6766
2005:04	11.4764	11.4449	12.1510	1.1193	11.6766
2005:05	11.4764	11.4449	12.1510	1.1193	11.6766
2005:06	11.4764	11.4449	12.1510	1.1193	11.6766
2005:07	11.4764	11.4449	12.1510	1.1193	11.6766

2005:08	11.4764	11.4449	12.1510	1.1193	11.6766
2005:09	11.4764	11.4449	12.1510	1.1193	11.6766
2005:10	11.4764	11.4449	12.1510	1.1193	11.6766
2005:11	11.4764	11.4449	12.1510	1.1193	11.6766
2005:12	11.4764	11.4449	12.1510	1.1193	11.6766
2006:01	11.5391	11.5113	12.2102	1.1380	11.7434
2006:02	11.5391	11.5113	12.2102	1.1380	11.7434
2006:03	11.5391	11.5113	12.2102	1.1380	11.7434
2006:04	11.5391	11.5113	12.2102	1.1380	11.7434
2006:05	11.5391	11.5113	12.2102	1.1380	11.7434
2006:06	11.5391	11.5113	12.2102	1.1380	11.7434
2006:07	11.5391	11.5113	12.2102	1.1380	11.7434
2006:08	11.5391	11.5113	12.2102	1.1380	11.7434
2006:09	11.5391	11.5113	12.2102	1.1380	11.7434
2006:10	11.5391	11.5113	12.2102	1.1380	11.7434
2006:11	11.5391	11.5113	12.2102	1.1380	11.7434
2006:12	11.5391	11.5113	12.2102	1.1380	11.7434
2007:01	11.5837	11.6053	12.2615	1.1245	11.8240
2007:02	11.5837	11.6053	12.2615	1.1245	11.8240
2007:03	11.5837	11.6053	12.2615	1.1245	11.8240
2007:04	11.5837	11.6053	12.2615	1.1245	11.8240
2007:05	11.5837	11.6053	12.2615	1.1245	11.8240
2007:06	11.5837	11.6053	12.2615	1.1245	11.8240
2007:07	11.5837	11.6053	12.2615	1.1245	11.8240
2007:08	11.5837	11.6053	12.2615	1.1245	11.8240
2007:09	11.5837	11.6053	12.2615	1.1245	11.8240
2007:10	11.5837	11.6053	12.2615	1.1245	11.8240
2007:11	11.5837	11.6053	12.2615	1.1245	11.8240
2007:12	11.5837	11.6053	12.2615	1.1245	11.8240
2008:01	11.6978	11.6132	12.3222	1.1723	11.8845
2008:02	11.6978	11.6132	12.3222	1.1723	11.8845
2008:03	11.6978	11.6132	12.3222	1.1723	11.8845
2008:04	11.6978	11.6132	12.3222	1.1723	11.8845
2008:05	11.6978	11.6132	12.3222	1.1723	11.8845
2008:06	11.6978	11.6132	12.3222	1.1723	11.8845
2008:07	11.6978	11.6132	12.3222	1.1723	11.8845
2008:08	11.6978	11.6132	12.3222	1.1723	11.8845
2008:09	11.6978	11.6132	12.3222	1.1723	11.8845
2008:10	11.6978	11.6132	12.3222	1.1723	11.8845
2008:11	11.6978	11.6132	12.3222	1.1723	11.8845
2008:12	11.6978	11.6132	12.3222	1.1723	11.8845