THE EFFECT OF BANK LENDING CHANNEL ON THE MONETARY TRANSMISSION MECHANISM IN KENYA

Gabriel Mwangi Kabiro[1*] Dr. Esman Nyamongo[2]

1. **Commerce and Economics Department,**
   Jomo Kenyatta University of Agriculture and Technology
2. **Research and Policy Analysis Department, Central Bank of Kenya**

***mkabiro@yahoo.com Mobile No. 0738 145 987**

Abstract

Understanding the transmission mechanism is crucial for monetary policy. In this respect the special role of banking institutions in this mechanism has been studied both at a theoretical and empirical level. Existing evidence shows that banks alter their lending behavior in specific ways following a change in monetary policy.

Theory on the bank lending channel identifies incentive mechanisms that work through the capital structure of banks, their liquidity levels and/or their size and argues that these mechanisms may play an important role in altering bank lending when there is a change in policy interest rates. Empirical evidence on these propositions is restricted to testing whether the interaction of monetary policy variables with bank liquidity and capitalization levels is an important determinant of loan growth.

Given the cross-sectional heterogeneity in the banks' response to monetary policy change based on their characteristics, three different bank characteristics were included in the model specification; liquidity, capitalization and size (total assets). To further distinguish between the demand side and the supply side effects of monetary policy on the amounts of credit disbursed, GDP growth rate and inflation rate were included as controls for loan demand. The broad objective of this study was to investigate the effectiveness of the lending channel of monetary policy in Kenya. Specifically, the study sought to assess the effect of banks' liquidity, capitalization and size (total assets) on credit to the economy and the impact of a monetary policy change on loan supply. This was accomplished using a Panel Econometrics Approach using bank level data spanning 2006- 2011 for 35 banks in Kenya. From the study, it was found that banks' total assets and liquidity levels have a significant effect on the loans they disburse while capitalization was found to be weakly significant.

Key words: *Monetary Transmission Mechanisms, Bank Lending channels*

1.1 Introduction

There is wide agreement about the major goals of economic policy: high employment, stable prices and rapid growth. But there is less agreement that these goals are mutually compatible and there is least agreement about the role that various instruments of policy can and should play in achieving the several goals (Friedman, 1968).One such instrument is the monetary policy which has been at the centre of macroeconomic policymaking. It is a powerful tool, but one that sometimes has unexpected or unwanted consequences. To be successful in conducting monetary policy, the monetary authorities must have an accurate assessment of the timing and effect of their policies on the economy, thus requiring an understanding of the mechanisms through which monetary policy affects the economy (Mishkin, 1995). While most economists agree that monetary policy actions have some effects on real GDP and inflation, there is far less agreement, however, about exactly how monetary policy exerts its influence or what happens in the interim.

Changes in short term interest rates are the first step in the transmission of monetary policy. Officially, central banks set interest rates based on inflation and economic growth considerations. According to the neoclassical view, monetary policymakers use their leverage over short term interest rates to influence the cost of capital and, consequently, spending on durable goods, such as fixed investments, housing, inventories and consumer durables. In turn, changes in aggregate demand affect the level of production (Bernanke and Gertler, 1995).

Often, when there is a disequilibrium in the economy characterized by extreme inflationary or deflationary pressures, central banks face the challenge of determining the length of time required before any policy actions they take can have effects on macroeconomic variables mainly, inflation and output. This is in addition to the major challenge of the existence of several transmission channels such as interest rate, exchange rate, expectations and bank lending, among others, through which policy actions are transmitted simultaneously (Misati *et al.*, 2011). Because of the impact monetary policy has on financing conditions in the economy (not just the costs, but also the availability of credit) but also because of its influence on expectations about economic activity and inflation, monetary policy can affect the prices of goods, asset prices, exchange rates as well as consumption and investment.

Interest rate cuts, for example, lower the cost of borrowing, which results in higher investment activity and the purchase of consumer durables. The expectation that economic activity will strengthen may also prompt banks to ease lending policy, which in turn enables businesses and households to boost spending. A low interest-rate environment may contribute to higher consumer spending, and make companies' investment projects more attractive.

The composition of banks' portfolio change systematically in response to monetary policy initiatives. Bernanke and Blinder, 1992 conclude that the impact of monetary policy on the investment of firms is not entirely demand driven, and that at least part of it can be explained by the supply side or the bank lending channel. Ultimately, the lending view of monetary policy transmission boils down to the two part assertion that 1) open market operations affect the supply of

bank loans; and 2) that these loan supply shifts in turn affect both the magnitude of aggregate output and its composition (Kashyap and Stein, 1993).

1.2 Trend of Key Macroeconomic Variables in Kenya

This section looks at the trends of short term interest rates, output, money supply and inflation in Kenya for the period 1997 and 2012 in relation to monetary policy.

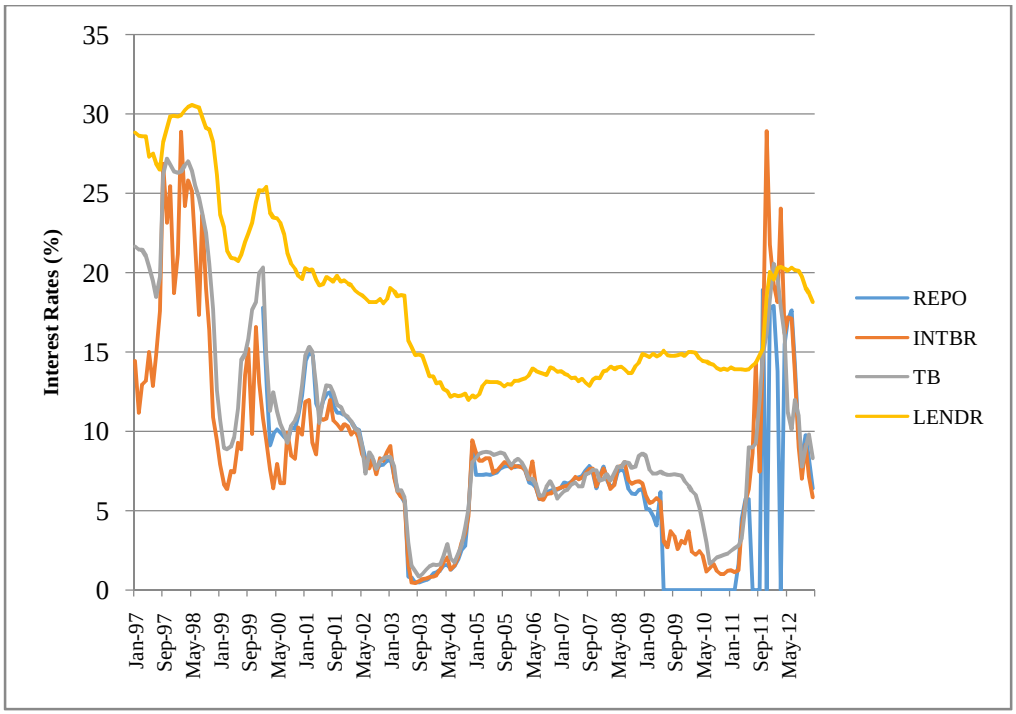


Figure 1.1: Evolution of short term interest rates and retail rates

Figure 1.1 shows the evolution of short term interest rates and retail rates. There is a general synchronization on the movements of the interest rates especially reflecting the response of the interbank rate (INTBR) to a decrease or increase in the REPO and the 91 day Treasury bill (TB) rates. For example, there is a general decrease in the interest rates during the period 1997 to 2002.Interbank rates averaged about 15.20 percent, TB rate at 15.78 percent and the commercial banks' base lending rate stood at 24.43 percent. The low rates recorded in early 2003 and in 2010/2011 could be as a result of the great optimism and expectations that the country experienced with the change of government/regime in 2002 for the first time after the introduction of multiparty democracy. The country also witnessed the promulgation of a new constitution in August 2010 after many false starts and failed attempts. These events may have brought positive sentiments and hopes for stability, rule of law and a conducive business environment.

Between 2002 and 2007, there was less volatility in interest rates movements and the rates stabilized during the period save for the year 2009 when the rates recorded the lowest levels averaging 0.47 percent, 0.54 percent and 0.83 percent for the REPO, INTBR and TB respectively.

The Interbank rate stood at 5.67 percent, the 91day TB rate at 5.84 percent and the lending rate maintained stickiness at around 13.12 percent. However, commercial banks' average lending rate (LENDR) remains generally above the other rates at more than double. This is in response to the CBR rates as well as attempts to hedge against inflationary effects. High interest rates raise the cost of borrowing which lead to low credit uptake by the private sector thus impacting on investment, consumption, output and inflation.

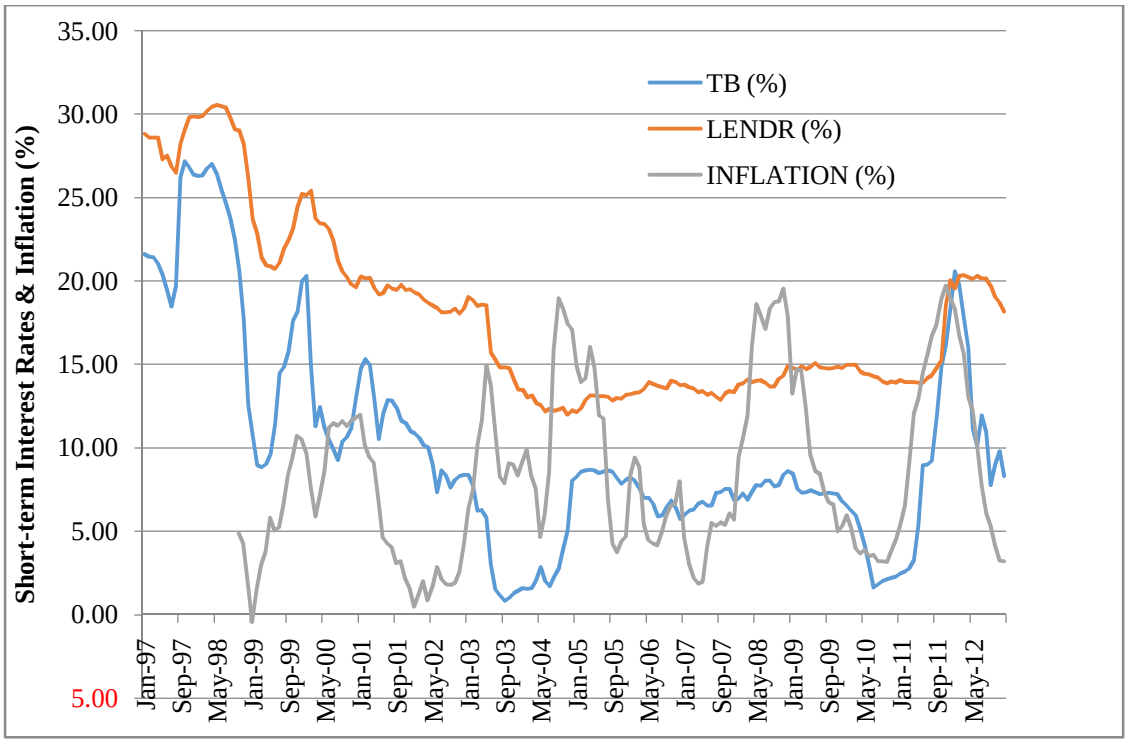


Figure 1. 2: Short-Term Interest Rates vs. Annual Inflation

The Central Bank of Kenya influences short-term interest rates by adjusting the Central Bank Rate. Short-term interest rates in turn influence short-term demand in the economy and therefore influence prices. From figure 2, the 91day Treasury bill rate was generally on a downward trend from 1997 to 2003 then flattened out from 2005 to 2009 before rising again sharply in 2011. This is as explained in figure 1. The trend is also reflected in the commercial banks' lending rates. High inflation was also recorded in the periods succeeding low interest rates, for example, in 2004, 2008 and 2011, due to increased consumption as a result of cheap credit. The sharp rise in the interest rates in 2011 to about 20% could also be due to the challenges that faced the financial sector during that period that included high inflation and the ripple effects of the global financial crisis and the euro zone crisis.

The CBK's Monetary Policy Committee responded to contain the rising cost of living and the depreciating Kenya shilling which had hit a low of KES 107 to the dollar by raising the Central Bank Rate (CBR) from 6.25 percent in May, 2011 to 18 percent by December, 2011 and the Cash Reserve Ratio (CRR) from 4.5 percent to 5.25 percent during the period. Commercial banks

responded to this adjustment by raising interest rates thereby reducing liquidity in the market and gradually calming inflation and stabilizing the exchange rate.

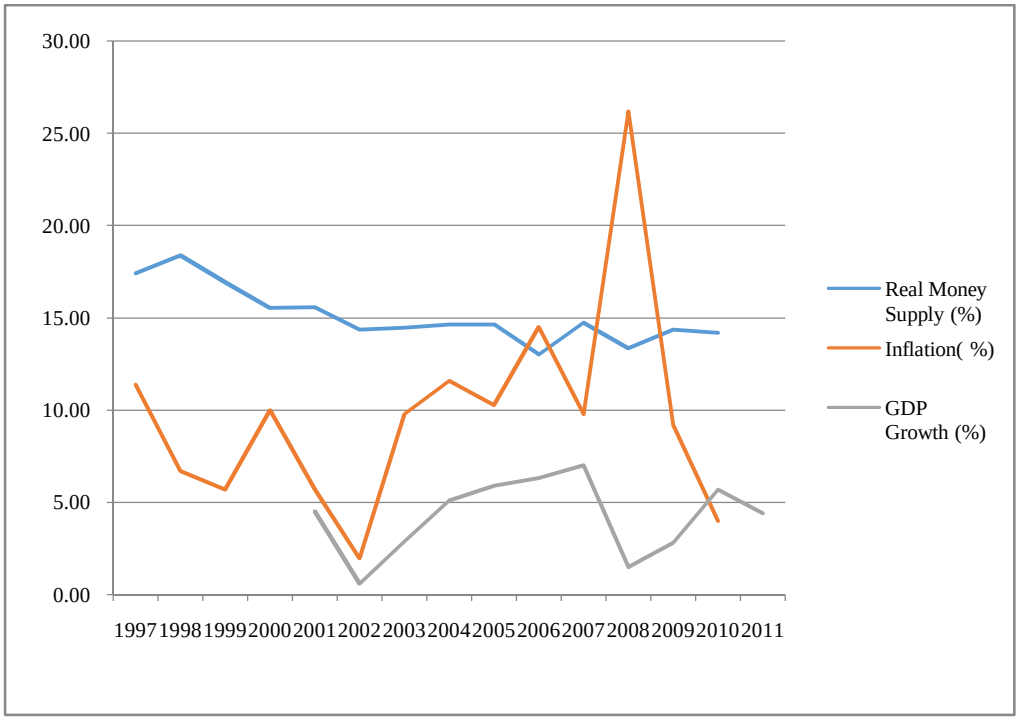
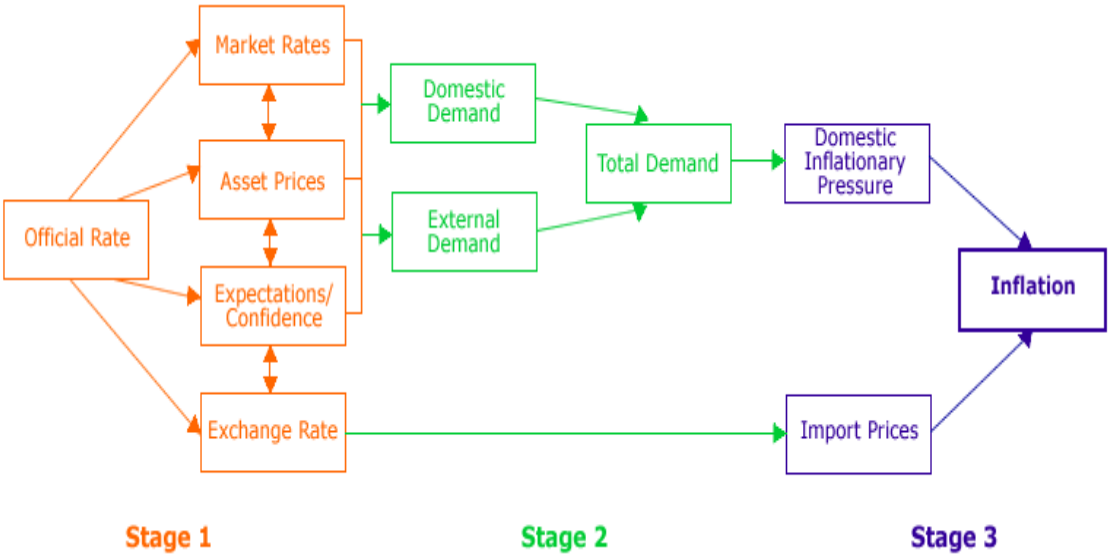


Figure 1.3: Growth of Money Supply and GDP and Inflation trends

Figure 1.3 shows a gradual decline in the annual growth of money supply during the period under study. Between 1997 and 2001, the growth of money supply averaged about 16.38 percent before becoming sticky at 14.3 percent in the period 2002 – 2007. The supply further reduced slightly to around 13.97 percent during the period 2008-2011. This shows the pursuit of a tight monetary policy by the monetary authority. Inflation was, however, on an upward trend averaging 6.92 percent between 1997 and 2002. The rate rose to an average of 11.2 percent between 2003 and 2007 before rising further to stand at about 13.13 percent during the period 2008 – 2012.This is contrary to theory underlying monetary policy where a decrease in money supply is expected to result in the long run decrease in inflation. This suggests the existence of other factors having an impact on inflation but which cannot be influenced through monetary policy. For example, an increase in world food prices, increase in international crude oil prices, drought and global financial crises could adversely affect the general prices of goods in the country. The lowest recorded inflation rate occurred in 2002 at 2 percent. This is probably as a result of the great optimism and expectations that the country had with the change of government for the first time after the introduction of multiparty democracy. The highest was in 2008 where it rose to a high of about 19.7percent probably as a result of the aftermath of the post-election violence that disrupted the production and distribution of goods and services. The high inflation could also be attributed to inadequate rainfall in the country during that year.

2.1 Theoretical Review/Conceptual Framework

Monetary policy guards against inflation and ensures stability of prices, interest rates and exchange rates (CBK). The Central Bank formulates a policy to expand or contract money supply in the economy after detailed analysis and estimation of the demand for money in the economy.



Source: ECB

Figure 2.1: An illustration of the transmission mechanism from interest rates to prices

The transmission mechanism is basically a three stage process;

The *first stage* is that is that a change in the official interest rate set by the MPC will affect other interest rates. Commercial banks and other financial institutions have to react to any official rate change by changing their own savings and loan rates. The change will also affect the prices of many assets; shares, houses, securities. The exchange rate may change as demand and supply of the Kenya Shilling adapt to the new level of interest rates. Finally there may also be an effect on the expectations of both firms and individuals. They may become more or perhaps less confident about the future path of the economy.

The *second stage* is that all these changes in markets will affect the spending patterns of consumers and firms. In other words there will be an effect on aggregate demand. Higher interest rates are likely to reduce the level of aggregate demand, as consumers are affected by the increase in rates and may look to cut back spending. There will also be intermediate effects as the level of imports and exports change in response to possible changes in the exchange rate.

The *third stage* is the impact of the aggregate demand change on GDP and inflation. This will tend to depend on the relative levels of aggregate demand and supply. If there is enough capacity in the economy then an increase in AD may not be inflationary. However if the economy is already at bursting point producing as much as it can, then any further AD increase may be inflationary.

The monetary transmission mechanism operates through various channels;

The Balance Sheet Channel: When monetary policy contracts, for example, and market interest rates rise, the financial position of firms may weaken. This may be due to an increase in their interest payments which reduces their net cash flows or due to a reduction in the value of their assets and thus collateral leading to a rise in the cost of external funds.

Exchange Rate Channel: In the case of a flexible exchange rate regime and an open capital account, the initial impact of an increase in the interest rate is to make deposits in domestic currency more attractive than those in foreign currencies, leading to an exchange rate appreciation.

The precise impact is uncertain and will depend on expectations about domestic and foreign interest rates and inflation, which may themselves be affected by a policy change. At a second stage, the appreciation of the exchange rate will have a direct impact on the prices of tradables through imported goods and services, and will also affect net exports (and therefore GDP and economic activity) by altering the relative prices of exports and imports (Sanchita Mukherjee and Rina Bhattacharya, 2011).

Asset Price Channel: Another potential transmission channel of monetary policy is through fluctuations in assets prices. A tighter monetary policy can put downward pressure on equity prices, and on the prices of other financial assets and real estate, by making these assets relatively less attractive compared to bonds. Falling asset prices can affect aggregate demand in two ways (Sanchita Mukherjee and Rina Bhattacharya, 2011).

The Interest Rate Channel: This is the primary mechanism believed to be at work in the transmission of monetary policy in conventional macroeconomic models. An increase in the Central Bank Rate (contractionary monetary policy), for example, is expected to directly impact on some short term wholesale market interest rates such as the Interbank Rate or the Treasury Bill Rate and then transmitted to retail market interest rates such as the Bank Lending and Deposit Rates.

3. RESEARCH METHODOLOGY

3.1 Research Design

To be able to investigate the lending channel of monetary policy the following model was used:

$$\Delta l_{i,t} = \beta_0 + \beta_1 \Delta CBR_{i,t-1} + \beta_2 \Delta ASSETS_{i,t-1} + \beta_3 \Delta CAP_{i,t-1} + \beta_4 \Delta LIQ_{i,t-1} + \beta_5 GDP_{i,t-1} + \beta_6 INF_{i,t-1} + \mu_i + \varepsilon_{i,t-1}$$

Where t represents time (in years), μ_i is the bank specific fixed effect; and $\varepsilon_{i,\,t-1}$ is the error term. Since a change in monetary policy in time, t is likely to affect bank credit disbursal with at least a one period lag, $\Delta l_{i,t}$ is modeled as a function of $\Delta CBR_{i,t-1}$, the lagged change in the monetary policy instrument.

3.2 The Target Population

The Central Bank of Kenya (CBK), which is the banking industry regulator in Kenya, classifies banks based on market share and total assets of the lenders. A bank's market share is determined by the size of its total assets, loan accounts, deposit base, and total capital. The banks are classified as large, mid-tier and small-sized.

CBK classifies a bank as being "large" when it crosses more than five per cent market share. Mid-tier banks are those with a market share below five per cent but larger than one per cent, while those with less than a percentage are classified as small banks. Of the 43 banks in Kenya, there are six large banks which control 53.7 per cent of the industry, 15 mid-tier lenders and 22 small sized banks whose combined market share is 9.46 per cent.

Kenya's six large lenders dominate the banking system in terms of deposits and loan advances. CBK data indicates that over 55 per cent of the Sh1.5 trillion total cash deposits are held by the big six, 15 mid-tier lenders control 35 per cent while the 22 small banks hold 10 per cent.

3.3 Sample Size

A sample of 35 banks out of 43 banks in Kenya was taken based on data availability. Out of these, 6 were large, 13 mid-tier and 16 small-sized banks. This was representative of the banking industry in Kenya. . The variables were extracted from the Audited Financial Statements and Disclosures of Commercial Banks in Kenya sourced from the Central Bank of Kenya.

3.4 Data Analysis

The EViews 7 software was used to analyze data from about 35banks from Kenya's banking industry. For each bank, data on annual total assets, total shareholders' funds, total advances in loans and capitalization and reserves from year 2006 -2011 were taken. In addition, the annual GDP growth and inflation rates for the same period were used. The Central Bank Rate (CBR) was used as the monetary policy instrument. Data was analyzed and presented in both tables and graphs to check for trends and interpretation. The findings were presented in tables, interpreted in sections focusing on each of the research questions and study hypothesis and discussed so as to link and fill gaps in previous studies.

4.2.1Discussion of Results

4.2.2 Choice of Model: Testing for the Validity of the Fixed Effects Model

Panel data analysis has three more-or-less independent approaches:

- Pooled panels; assumes that there are no unique attributes of individuals within the measurement set, and no universal effects across time.
- Fixed effects models; assumes that there are unique attributes of individuals that are not the results of random variation and that do not vary across time. It assumes differences in intercepts across groups or time periods.
- Random effects models; assumes there are unique, time constant attributes of individuals that are the results of random variation and do not correlate with the individual regressors.

This model is adequate if we want to draw inferences about the whole population, not only the examined sample.

The choice of the appropriate model depends upon the objective of the analysis, and the problems concerning the exogeneity of the explanatory variables. The first two models were considered in this analysis and their estimation results are reported in Table 4.1. The Pooled regression model assumes that the coefficients (including the intercepts) are the same for all banks. The fixed effects model caters for heterogeneity or individuality among the banks by allowing each to have its own intercept value which is time invariant.

As to which model is appropriate, we use the F-test.

4.2.3 Testing for the Validity of F- Tests

The pooled regression model fails to distinguish between the various variables i.e it denies the heterogeneity or individuality that may exist among the banks and implicitly assumes that the coefficients (including the intercepts) are the same for all banks.

The Fixed Effects Model allows for heterogeneity or individuality among the banks by allowing each to have its own intercept value which is time invariant while in a Random Effects Model, all banks will have a common mean value for the intercept. The F-test for the Fixed Effects were carried out to check which one was the most appropriate for this analysis.

4.2.4 The F-Test

In this test, we test for the existence of individual effects, thus;

H_0: $\mu_0 = \mu_1 = \mu_2 ... \mu_{n-1} = 0$

However, the result for F-Test shows a p-value of 0 and and a t-statistic of 14.47, 7.36 and 12.306 for the full sample, medium and small banks categories respectively. These reject the null that the cross-section effects are redundant in those categories and therefore conclude that there are significant cross section effects in these categories that affects their different reactions reactions to a policy change. The p-value for liquidity, loans and total assets are also significant at 1% level of significance for all models and all categories.

Table 4.1: Estimation Results

Variable	Full Sample		Large Banks		Medium Banks		Small Banks	
	Pooled Model	**Fixed Effects Model**	**Pooled Model**	**Fixed Effects Model**	**Pooled Model**	**Fixed Effects Model**	**Pooled Model**	**Fixed Effects Model**
Log (Loan(-1))	0.278*** (11.059)	0.028 (1.206)	0.205*** (4.392)	0.124 (1.716)	0.416*** (7.9)	0.146** (2.238)	0.098*** (2.814)	0.007 (0.259)

CBR	-0.023**	-0.028**	0.04*	0.066	-0.042**	-0.08***	0.025	0.038
	(-2.364)	(-2.136)	(1.803)	(1.55)	(-2.573)	(-2.898)	(1.41)	(1.572)
Log	0.671***	0.947***	0.623***	0.647***	0.590***	0.739***	0.859***	1.135***
(Assets)	(26.209)	(28.447)	(9.35)	(5.193)	(10.187)	(8.997)	(21.58)	(21.051)
Log(Cap)	0.055***	0.004	0.167***	0.302***	-0.001	0.034	0.032	-0.112**
	(2.784)	(0.141)	(4.8)	(3.873)	(-0.02)	(0.493)	(1.129)	(-2.093)
Liquidity	-0.01***	-0.01***	-0.01***	-0.009***	-0.01***	-0.005***	-0.011***	-0.011***
	(-21.45)	(-18.83)	(-9.832)	(-8.091)	(-9.041)	(-3.303)	(-13.29)	(-9.089)
GDP	0.024***	0.023***	0.001	-0.017	0.034***	0.06***	-0.009	-0.028*
	(3.13)	(2.599)	(0.071)	(-0.588)	(2.70)	(3.179)	(-0.637)	(-1.703)
Inflation	0.014***	0.015***	-0.004	-0.015	0.021***	0.037***	-0.005	-0.014
	(3.344)	(2.824)	(-0.456)	(-0.850)	(3.003)	(3.237)	(-0.602)	(-1.41)
R^2	0.998	0.999	0.992	0.996	0.994	0.998	0.982	0.993
NxT	175	175	30	30	65	65	80	80
F-Test		14.472		2.107		7.36		12.306
		[0.000]		[0.114]		[0.000]		[0.000]

KEY: * - Significant at 10% [.] - p-value

** - Significant at 5% t-values in brackets

*** - Significant at 1%

The estimation results are reported in Table 4.1 above. Here, the pooled and fixed effects models for the full sample and for each of the bank categories; large, medium and small, are reported. The estimated coefficient of the policy rate, CBR, is negative and significant at 5 percent level in the full sample and the medium bank category with the estimated coefficients being significant at the conventional levels of testing. This is consistent with the expectations of a monetary policy direction in relation to loan disbursement. However, the estimated coefficient is positive and generally insignificant in the large and small banks categories. This therefore suggests that large and small sized banks do not respond to monetary policy while medium sized banks do respond. Possibly the large banks could be leveraging on their heavy investment in information communication technology and strategy. The small banks may be lending to a niche market or specific sector of the economy, for example small and medium enterprises, or informal sectors and thus their effect may be insignificant. However, taken as a whole, from the full sample, the industry is responsive to the monetary policy direction.

Assets as used in this study represents the total assets of a bank and forms the basis of classification of a bank as large, medium or small as discussed in Section 3.3.1. The estimated coefficient of assets is positive and significant at 1 percent level for all bank categories and models in the study.

This shows that bank size, as represented by its total assets, has a positive and significant relationship with the amount of bank credit to the economy.

In this study, a positive relationship was expected between capital adequacy and amount of credit lent. The estimated coefficient of bank capitalization is positive and significant at 1 percent level in the large banks category and the pooled model of the full sample but insignificant in the medium and small banks categories. This may be attributed to the fact that the largest and most liquid banks dominate the banking system in terms of deposits and loan advances. CBK data indicates that over 55 per cent of the Sh1.5 trillion total cash deposits are held by the big six banks. The size of bank is important as the large banks can encounter fewer asymmetric information problems than the small ones and therefore may find it easier to raise non-deposit funds in response to a monetary shock. Capitalization determines that well capitalized banks have easier access to non-deposit funds and therefore can decrease their loan supply by a lesser amount than poorly capitalized banks. Some banks in Kenya are branches whose parent companies are major banking institutions in developed countries and can easily turn to them for liquid funds in the event of a tight monetary policy. Our findings are consistent with other studies that tend to link lending to capital adequacy (Athanasoglou 2005; Goddard 2004; Bhaumik, et al, 2011; and Kashyap and Stein, 2000). Less capitalized and smaller banks, for example, may find it more difficult to raise capital and might cut back on lending or reduce lending growth far more than well capitalized and larger banks. Brissimis and Delis (2010), found that monetary policy changes cause a very different response of bank lending on the basis of their capital structures, with more capitalized banks responding less to monetary policy changes. In particular, high capitalization tends to buffer the negative impact on bank lending of a shift in policy rates.

The survival of commercial banks largely depends on their ability to manage their liquidity. It is designed to ensure that financial institutions have the necessary assets on hand to ride out short-term liquidity disruptions. In this study, all models have shown that liquidity has a strong and negative relationship with lending. The estimated coefficient of liquidity is negative and significant at 1 percent level across all bank categories and models in the study. This therefore shows that liquidity is a critical determinant of the level of bank credit to the economy. The negative relationship probably suggest that banks may turn to their liquid assets to offer more loans, especially in a tight monetary policy, and thus maintaining their loan portfolio and the more the loans a bank disburse, the less the liquid assets it retains. This finding tends to support other studies such as Cheong and Boodoo (2008), which showed that one of the main reasons for the incomplete REPO pass through is the existence of high levels of liquidity in the financial system. Saxegaard (2006), finds that excess liquidity weakens the monetary transmission mechanism and thus the ability of monetary authorities to influence demand conditions in the economy.

GDP growth and inflation are used in this study as proxies of the operating environment. The estimated coefficients of both GDP and inflation are both positive and significant at 1 per cent level in both the full sample and the mid-tier banks category only. This indicates that if an expansionary monetary policy is in place, say, money supply will increase through the increased loan uptake

which will boost the economy through investment in productive sectors and at the same time overheat the economy by raising overall inflation. However, the estimated coefficients for both variables are negative and statistically insignificant in both the large and small banks' categories suggesting that, the economic environment may not influence their lending.

5. 1 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.2 Conclusion

5.2.1 Effect of Banks' Total Assets and Liquidity Levels on Credit to the Economy

The estimated coefficient of assets is positive and significant at 1 percent level for all bank categories and models in the study. This shows that bank size, as represented by its total assets, has a positive and significant relationship with the amount of bank credit to the economy.

All models have also showed that liquidity has a strong and negative relationship with lending. The estimated coefficient of liquidity is negative and significant at 1 percent level across all bank categories and models in the study. This therefore shows that liquidity is a critical determinant of the level of bank credit to the economy. The negative relationship probably suggest that banks may turn to their liquid assets to offer more loans, especially in a tight monetary policy, and thus maintaining their loan portfolio and the more the loans a bank disburse, the less the liquid assets it retains.

This finding tends to support other studies such as Saxegaard (2006) who found that excess liquidity weakens the monetary transmission mechanism and thus the ability of monetary authorities to influence demand conditions in the economy.Cheong and Boodoo (2008) found that one of the main reasons for the incomplete REPO pass through is the existence of high levels of liquidity in the financial system.

Therefore the null hypothesis $H_0$1 and $H_0$3 were rejected and concluded that banks' total assets and liquidity levels have a significant effect on the loans they disburse.

5.2.2 Effect of Banks' Capitalization and CBR on Credit to the Economy

The estimated coefficient of bank capitalization is positive and significant at 1 percent level in the large banks category and the pooled model of the full sample but insignificant in the medium and small banks categories. This may be attributed to the fact that the largest and most liquid banks dominate the banking system in terms of deposits and loan advances. CBK data indicates that over 55 per cent of the Sh1.5 trillion total cash deposits are held by the big six banks. The size of bank is important as the large banks can encounter fewer asymmetric information problems than the small ones and therefore may find it easier to raise non-deposit funds in response to a monetary shock. policy need not bring any response in terms of reduction in credit.

This is consistent with other studies that tend to link lending to capital adequacy (Athanasoglou 2005; Goddard 2004; Bhaumik, et al, 2011; and Kashyap and Stein, 2000). Less capitalized and

smaller banks, for example, may find it more difficult to raise capital and might cut back on lending or reduce lending growth far more than well capitalized and larger banks. Brissimis and Delis (2010) found that monetary policy changes cause a very different response of bank lending on the basis of their capital structures, with more capitalized banks responding less to monetary policy changes. In particular, high capitalization tends to buffer the negative impact on bank lending of a shift in policy rates.

The estimated coefficient of the policy rate, CBR, is negative and significant at 5 percent level in the full sample and the medium bank category with the coefficient being significant at 1 percent level in the fixed effect model of the medium bank category. However, the estimated coefficient is positive and generally insignificant in the large and small banks categories. This therefore suggests that large and small sized banks do not respond to monetary policy while medium sized banks do respond. The results showed that large banks can, to a certain extent, shield their loan portfolio from monetary policy changes. However, since the few big banks in Kenya control the majority of total assets in the banking industry, in total capitalization does not explain the lending reaction of banks and that loan responses to monetary policy changes are not statistically significant, suggesting that a bank lending channel may not be effective.

5.3 Recommendations

In view of our findings we make the following recommendations:

1. The large and small banks do not appear to respond to monetary policy. However, medium banks do respond. Therefore the monetary authority should investigate the reasons why this is the case and put in place measures to ensure that these bank banks categories respond to policy decisions.
2. All the bank categories respond to the operating environment variables. It is therefore recommended that the government continues to pursue policies to ensure the operating environment is conducive. The government should ensure low rates of inflation and high GDP growth.
3. Prudential supervision, and in particular capital adequacy requirements, cash reserve ratio and liquidity levels which affects the composition of bank asset portfolios, should be enhanced since some banks are able to absorb monetary shocks and halt the transmission of the policy.
4. Banks can also alleviate the problem of market imperfection by using credit reference bureaus to vet borrowers on their creditworthiness. Loan products can also be tailor made to specific sectors of the economy including small-scale borrowers so that the type of collaterals are flexible and varied to cast the net wider and improve on loan uptake and financial inclusiveness.

5.4 Suggestions for Further Research

In this study it is noted that large and small banks do not respond to monetary policy decisions. However, the reasons which such behavior is not investigated in this study. We therefore recommend that future research should be directed at investigating the reasons for such behavior.

As observed above, it is argued that bank heterogeneity, while useful in accounting for loan supply shifts, is not the only, and indeed not the most important element on which the search for an aggregate bank lending channel could be based (Kashyap and Stein, 2000). Loan advances may be affected by other factors other than the cost. Banks may be motivated by other by higher rates elsewhere and ignore the private sector.

A study on the relationship between government securities holding by commercial banks and the credit to the private sector and/or the how rates on government papers affect the bank credit to the private sector may further be pursued. This is because banks also tend to use government's borrowing rates as their pricing benchmarks for commercial loans.

Table 4.1: Estimation Results

Variable	Full Sample		Large Banks		Medium Banks		Small Banks	
	Pooled Model	**Fixed Effects Model**	**Pooled Model**	**Fixed Effects Model**	**Pooled Model**	**Fixed Effects Model**	**Pooled Model**	**Fixed Effects Model**
Log (Loan(-1))	0.278*** (11.059)	0.028 (1.206)	0.205*** (4.392)	0.124 (1.716)	0.416*** (7.9)	0.146** (2.238)	0.098*** (2.814)	0.007 (0.259)
CBR	-0.023** (-2.364)	-0.028** (-2.136)	0.04* (1.803)	0.066 (1.55)	-0.042** (-2.573)	-0.08*** (-2.898)	0.025 (1.41)	0.038 (1.572)
Log (Assets)	0.671*** (26.209)	0.947*** (28.447)	0.623*** (9.35)	0.647*** (5.193)	0.590*** (10.187)	0.739*** (8.997)	0.859*** (21.58)	1.135*** (21.051)
Log(Cap)	0.055*** (2.784)	0.004 (0.141)	0.167*** (4.8)	0.302*** (3.873)	-0.001 (-0.02)	0.034 (0.493)	0.032 (1.129)	-0.112** (-2.093)
Liquidity	-0.01*** (-21.45)	-0.01*** (-18.83)	-0.01*** (-9.832)	-0.009*** (-8.091)	-0.01*** (-9.041)	-0.005*** (-3.303)	-0.011*** (-13.29)	-0.011*** (-9.089)
GDP	0.024*** (3.13)	0.023*** (2.599)	0.001 (0.071)	-0.017 (-0.588)	0.034*** (2.70)	0.06*** (3.179)	-0.009 (-0.637)	-0.028* (-1.703)
Inflation	0.014*** (3.344)	0.015*** (2.824)	-0.004 (-0.456)	-0.015 (-0.850)	0.021*** (3.003)	0.037*** (3.237)	-0.005 (-0.602)	-0.014 (-1.41)
R^2	0.998	0.999	0.992	0.996	0.994	0.998	0.982	0.993
NxT	175	175	30	30	65	65	80	80
F-Test		14.472 [0.000]		2.107 [0.114]		7.36 [0.000]		12.306 [0.000]

KEY: * - Significant at 10% [.] - p-value

** - Significant at 5% t-values in brackets

*** - Significant at 1%

REFERENCES

Bernanke, Ben S. and Gertler M., 1995, "Inside the Black Box: The Credit Channel of Monetary Policy Transmission," *Journal of Economic Perspectives*, vol.9,no.4, pp 27-48

Bhaumik, S.K., et al., 2011, "Implications of Bank Ownership for the Credit Channel of Monetary Policy Transmission: Evidence from India," *Journal of Banking and Finance*,2011.02.003

Brissimis, S.N. and Delis, M.D., 2010, "Bank Heterogeneity and Monetary Policy Transmission" *ECB Working Paper Series, No. 1233/August 2010* (Frankfurt, Germany: European Central Bank).

Brissimis, S.N., et al., 2001, "Is There a Bank Lending Channel of Monetary Policy in Greece? Evidence from Bank Level Data" *ECB Working Paper Series, No. 104/December 2001* (Frankfurt, Germany: European Central Bank).

Buigut, S., 2009, "Monetary Policy Transmission Mechanism: Implications for the Proposed East African Community Monetary Union,"
http://www.csae.ox.ac.uk/conferences/2009-EdiA/paperlist.html

Buigut, S., 2010 "Is there a Bank Lending Channel of Monetary Policy in Kenya?" *International Research Journal of Finance and Economics*, 45, 182-191.

Cheng, K.C., 2006, "A VAR Analysis of Kenya's Monetary Policy Transmission Mechanism: How Does the Central Bank's REPO Rate Affect the Economy?" *IMF Working Paper* 06/300.

Cheong, D. and Boodoo, E., 2008, "The Monetary Transmission Mechanism: A Closer Look at the Interest Rate Channel in Trinidad and Tobago," *Presented at the 29th Annual Review Seminar, Central Bank of Barbados, July 28-31, 2008.*

Christiano, L., M. Eichenbaum, and C. Evans, 2000, "Monetary Policy Shocks: What Have We Learned and to What End?" in *Handbook of Macroeconomics* (Amsterdam: North Holland).

Davoodi, H.R., et al, 2013, "monetary Transmission Mechanism in the East African Community: an Empirical Investigation," *IMF Working Paper No. 13/39* (Washington: International Monetary Fund).

Durevall, D., and Njuguna, N., 1997, "A Dynamic Model of Inflation for Kenya, 1974-1996," *IMF Working Paper No. 99/97* (Washington: International Monetary Fund).

Ehrmann, M. et al, 2001, "Financial Systems and the Role of Banks in Monetary Policy Transmission in the Euro Area," *ECB Working Paper Series, No. 105* (Frankfurt, Germany: European Central Bank).

Friedman, M., 1968, "The Role of Monetary Policy," *The American Economic Review*, vol.58, no.1, pp.1-17.

Friedman, M., 1970, "A Theoretical Framework for Monetary Analysis," *Journal of Political Economy*, vol.78, no.2, pp.193-238.

Jacobson, T., P. Jansson, A Vredin, and A. Warne, 2001, "Monetary Policy Analysis and Inflation Targeting in a Small Open Economy: A VAR Approach," *Journal of Applied Econometrics*, Vol. 16, pp. 487-520.

Kashyap, A.K. and Stein, J.C., 1993, "Monetary Policy and Bank Lending," *National Bureau of Economic Research* Working Paper Series No. 4317 (NBER, Cambridge, MA)

Kim, S. and Roubini N., 2000, "Exchange Rate Anomalies in the Industrial Countries: A Solution with a Structural VAR Approach," *Journal of Monetary Economics,"*pp.561-568.

Maturu, B. et al, 2010, "Monetary Policy Transmission Mechanism in Kenya: a VAR Approach," *Working Paper, Central Bank of Kenya*.

Misati, R. and Nyamongo, E., 2012, "Asset Prices and Monetary Policy in Kenya," *Journal of Economic Studies*, vol.39 Iss: 4 pp. 451-468.

Misati, R., Nyamongo, E. and Kamau, A., 2011, "Interest Rate Pass-Through in Kenya," *International Journal of Development Issues*, vol.10 No.2 pp. 170-182.

Mishkin, F.S., 1995, "Symposium on the Monetary Transmission Mechanism," *Journal of Economic Perspectives*, vol.9, no.4, pp.3-10.

Mishra, P. et al, 2010, "Monetary Transmission in Low Income Countries," *IMF Working Papers* 10/223, International Monetary Fund.

Peersman, Gert and Frank Smets, 2003, "The Monetary Transmission Mechanism in the Euro Area: Evidence from VAR Analysis," *Monetary Transmission Mechanism inthe Euro Area*, Cambridge University Press.

Roseline, N.M. et al, 2012, "Feasibility of Inflation Targeting in an Emerging Market: Evidence from Kenya," *Journal of Financial Economic Policy*, vol.4 Iss: 2 pp. 146-159.

Saxegaard, Magnus, 2006, "Excess Liquidity and the Effectiveness of Monetary Policy: Evidence from Sub-Saharan Africa," *IMF Working Paper, No. 06/115* (Washington: International Monetary Fund).

Sims, C., 1986, "Are Forecasting Models Usable for Policy Analysis," *Federal Reserve Bank of Minneapolis Quarterly* Review, Vol. 10, pp. 2-16.

Sims, Christopher, and Zha, 1998, "Does Monetary Policy Generate Recessions?" *Federal Reserve Bank of Atlanta Working Paper 98-12.*

Sims, Christopher, 1980, "Macroeconomics and Reality," *Econometrica, 48(1)*, 1-48.

Tsangarides, C., 2010, "Monetary Policy Transmission in Mauritius Using a VAR Analysis," *IMF Working Paper, No. 10/36* (Washington: International Monetary Fund).

Taylor, John B., 1995, "The Monetary Transmission Mechanism: An Empirical Framework," *Journal of Economic Perspectives*, vol.9, no.4, pp11-26.