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Abstract

The role of banks in transmission of monetary policy in an economy has been a subject of theoretical and empirical investigations. This study attempts to empirically investigate the role played by private commercial banks in South Africa in transmitting the impulses of monetary policy shocks to the rest of the economy. Focus is placed on the bank lending channel of monetary transmission due to the importance of banks in the financial system. Specifically, we examine whether the central bank's monetary policy stance affects banks' lending behaviour. We specify and test the bank lending channel of monetary policy transmission in South Africa by using a panel structural approach that distinguishes banks according to size. The results indicate the prevalence of the bank lending channel in which banks play a pivotal role in the monetary policy transmission in South Africa. Also bank size had proved to appropriately discriminate banks in South Africa according to their external finance cost.

1 Introduction

Monetary policy is one of the key policies within an economy upon which the growth, development and sustainability of economic activities rests upon. Equally it calls for a good understanding of the avenues through which the policy stance will have its impulses transmitted to affect real variables within the economy. “When the Reserve Bank decides to influence the change in the repurchase rate, it sets in motion a series of economic events. . . the repo rate has direct effects on the variables in the economy, such as other interest rates, the exchange rate, money and credit, other asset prices and decisions on spending and investment”, (Smal & de Jager, 2001). The processes are referred to as monetary policy transmission mechanism channels and come in different forms;

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the traditional interest rate¹; credit view; exchange rates; and other asset prices. Under the traditional channel, the assumption is that, financial intermediaries (banks) offer no special services on asset side of their balance sheets. However this channel is incomplete in the sense that it offers no analysis of distributional or cross-sectional responses to policy actions- this deficiency is nonetheless met by credit view reasoning through establishing the role played by banks².

While the interest rate channel operates through the demand for loans, it is important to investigate whether there are relevant supply-side effects in the credit market that further affect monetary policy transmission. Knoop, (2008) argued that, changes in monetary policy (with repo rate as proxy) may affect bank loans supplied through reducing the bank's reserves or can vary the borrowers' and lenders' (banks') financial fundamentals thereby making default risk considerations crucial. The central bank must understand the extent to which individual bank's characteristics and the nature of the banking sector can amplify or cushion its efforts so as not to destabilise the economy. Identifying the transmission channels is important because they determine the most effective set of policy instruments, the timing of policy changes, and hence the main restrictions that central banks face in making their decisions, (Loayza and Schmidt-Hebbel, 2002).

Even if firms face a financial hierarchy, other forms of finance are not perfect substitutes of bank loans and furthermore some sources are inaccessible to some firms, for example not all firms can utilise equity financing option. The traditional interest view have failed to explain empirically how monetary policy affects the economy, a gap closed by the credit channel in the light of asymmetric information. Bernanke and Gertler, (1995) further argued that the relatively large fluctuations in aggregate spending, such as business fixed investment and inventory investment, cannot be fully explained by minor changes in the real interest rates.

The principal objective of this paper is to investigate the role played by banks in the transmission of monetary policy in South Africa. Specifically we seek to empirically investigate if bank size matter in the transmission of monetary policy through bank lending channel and, if so, what are the conclusions and policy recommendations to be drawn from this investigation. There is general agreement on the role of banks in transmission of monetary policy, that is, the existence of credit channel of the bank lending form. That bank lending channel exists is incontestable but inconclusive debate is on the impact of bank size in the channel.

The rest of the paper is organised as follows: Section 2 below provides an overview of the structure of South African Banking sector and monetary policy. Section 3 follows with literature review, both theoretical and empirical. Section

¹The channel is referred to as traditional because of the longest standing belief of the only way through which monetary policy shock impulses are transmitted to the rest of the economy

²According to South African Reserve Bank (SARB), banks refer to: Banks, Mutual banks, South African branches of foreign banks, Post bank and Land Bank. The business of a bank is the solicitation and advertising for and the acceptance of deposits from the general public on a regular basis and the utilisation of deposits accepted (SARB).

4 covers the methodology, estimation and analysis of results, while Section 5 provides summary and conclusion.

2 An overview of the Structure of Banking Sector and Monetary Policy in South Africa

2.1 Banking Sector

The customary role of banks has been that of intermediary- bringing together borrowers and lenders, which can only be done successfully and sustainably with careful management of credit, liquidity and interest rate risk, (First Rand, 2009). Monetary policy has an effect on how banks conduct their businesses, it is therefore imperative to understand how banks respond to the policy stance adjusting their traditional role and duty to ensure efficient financial resource allocation in the economy. How banks respond depends on the structure of the market, the specific bank size among other factors. The South African banking environment has always been highly concentrated, with the top four banks (Standard Bank of South Africa, Amalgamated Bank of South Africa -ABSA, Nedbank, and First National Bank- FNB) accounting for some 85% of the industry's assets, Goeller and Szymanski-KPMG (2005). The exit of Saambou, BoE and other smaller banks from the industry during 2002-2003 also contributed to this high concentration. Highly concentrated industry signifies oligopoly and if not well monitored can lead to price collusion by the few giants at the detriment of other participants and customers at large. The structure of the industry determines the level of efficiency and prices, with highly concentrated sectors reflecting adverse results. Besides exit of other players, mergers and acquisitions also contribute highly to the nature of competition within an industry.

Banks as lender to most small firms, (Small to Medium and Micro Enterprises-SMMEs) in South Africa, have their lending behaviour detect the investment spending by these enterprises, (Department of Trade, 2000). According to Nieman and Nieuwenhuizen (2009:3), SMMEs form 97.5% of all business in South Africa, generating 35% of the GDP, contributing 43% of the total value of salaries and wages paid, and employing 55% of all formal sector employees. The response to monetary policy shock by the banks will have effects on the access to credit by these small firms and individuals, therefore having an impact on spending and output. Credit is crucial for economic growth and monetary authorities have to ensure credit extension is possible, "...negative credit data had vindicated the (South African) central bank's decision to cut interest rates by 50 basis points in March 2010, as the scenario was not positive for growth, which is reliant on a buoyant consumer market", (I-Net, May 2010). To this, the monetary policy authorities need to comprehend the nature of the banking sector and how does it affect the response to a monetary policy shock by banks before coining the best monetary policy stance. Bernanke and Gertler, (1995) concluded that, according to advocates of the credit channel, monetary policy does not only affect the general level of interest rate, but also the size of

the external finance premium. The increase in external finance premium further constrains the small borrowers who have less retained earnings, thus would have depended on debt or equity.

As pointed out by Mboweni, (2004) South Africa has established a well-developed banking system which compares favourably with those in many developed countries and which sets her apart from many other emerging market countries. This may be due to the sound regulation system that the South African Reserve Bank (SARB) boasts of, as the banks are regulated in accordance with the principles set by the international Basel Committee on Banking Supervision³. The sector had witnessed great liberalisation with domestic banks having international offices as well as international banks having offices in South Africa, which greatly contributed to global service provision. The regulatory framework has a bearing on the nature of the market thereof and hence the behaviour of individual or group of banks faced with a monetary policy shock. Furthermore, entry, exit, merging and demerging also depends on this regulatory environment.

As shown in the attached Table 1, as of 2009, there were 18 South African controlled banks + non-resident controlled subsidiary banks, down from 41 in 2001; a constancy of two mutual banks since; 13 local branches of international banks down 2 from the 2001 figure; and 42 international banks' representative offices with a drop of 2 offices from the 2001 figures. In terms of numbers the banks in South Africa have deteriorated since 2001. It is however not conclusive to evaluate the soundness of the sector by bank numbers only, as for example, during 2009 the number of registered banks declined from 19 to 18 due to a transaction in which Absa Group Limited acquired all the shares in Meeg Bank Limited (Meeg). In terms of capitalisation and number of services provided, it may prove otherwise. Furthermore, the number of branches of foreign banking institutions also declined from 14 at the end of 2008 to 13 at the end of 2009 owing to the conversion of Commerz Bank Aktiengesellschaft (Johannesburg Branch) from a branch to a representative office. During 2009 four representative offices closed down and three new representative offices were registered, (Bank Supervision Department, 2009). The sector reached a peak in numbers of banks by year 2000, under all categories as is evident in Table 1. These dynamics within the sector influence the size of banks by any measure across time- others results in an increase in size while others end in a decrease.

The South African banking-sector information is dominated by the four largest banks, which contribute 84.6 per cent to the balance-sheet size of the banking sector, (Bank Supervision Department, 2009). This explains the current high concentration within the industry calculated using the Herfindahl-

³The Basel Committee on Banking Supervision provides a forum for regular cooperation on banking supervisory matters. Its objective is to enhance understanding of key supervisory issues and improve the quality of banking supervision worldwide. It seeks to do so by exchanging information on national supervisory issues, approaches and techniques, with a view to promoting common understanding. In this regard, the Committee is best known for its international standards on capital adequacy; the Core Principles for Effective Banking Supervision; and the Concordat on cross-border banking supervision- Bank for International Settlements, Available Online [<http://www.bis.org/bcbs/>]

Hirschman Index⁴. The index takes into account the relative size and distribution of the firms in a market, and approaches zero when a market consists of a large number of firms of relatively equal size. The index increases as the number of firms in the market decreases and as the disparity in size between those firms increases. The higher is the index the lesser the competition that exists in the market. An H-H index below 0.1 indicates that there is no concentration in an industry, while an H-H index between 0.1 and 0.18 is an indication of moderate concentration. An H-H index above 0.18 represents a highly concentrated industry that indicates the presence of oligopoly behaviour. According to SARB, Annual Reports, 2000-2009, the South African banking sector H-H index amounted to 0.189 at the end of December 2009 (see Table 2 attached). The index has remained high due to the continued dominance in terms of market share by the four largest banks. Industry concentration is of interest here as it reflects disparities with respect to size among banks. Higher disparity is worrisome if size really matters; it thus affirms the case for investigating the effect of size transmitting monetary policy shocks.

As can be seen from Figure 1, as attached, there has been a steady growth in South Africa's banking sector assets to GDP ratio from 2000 till 2008. Since then, the sector experienced a sharp decline in its assets, mainly in the form of loans and advances. This may be as a result of the Global financial crisis which made lenders review down their lending behaviour and scrutinise closely the borrowers' net worth. Thus the financial crisis starting from the end of 2008 might have contributed to the decline in credit extension by banks. In times of financial crisis banks often shun risk activities; the default risk is usually high during financial difficulties.

As stated above, the major assets components in the banking sector are loans and advances that primarily determine the role of banks in the transmission of monetary policy. The response of loan and advance extension by bank following a monetary policy shock changes the sector's balance sheet position and determines the availability of funds for investment and spending within the economy. When more loans are supplied, the assets of banks grew, implying a growth in access to funds for investment by firms and durable spending by households.

If there are more funds available for credit extension, the price of borrowing will be lower and this act as an incentive for investors and spenders to borrow more. The South African Bank Supervision Department, (2009), reported that a slowdown in the growth of gross loans and advances during 2009 further added to the decline in the growth of total assets. The changes in repo rate, that is, monetary policy, affects the costs of accessing funds for investment by firms, *ceteris paribus*, and for spending on durables by households. In other words, other banks, if larger enough to cushion the rate increase, may not pass it on to the borrowers. The repo rate increase will therefore not be a cost to borrowers and thus will fail to ultimately discourage borrowing. On the other hand, the

⁴The Herfindahl-Hirschman Index (H-H index) is a commonly accepted measure of market concentration in a banking system, calculated by squaring the market share, in terms of total assets, of each bank in the system and subsequently summing the squares, Badunenko et al, (2009)

said costs increase the risk faced by the banks, as the costs of funds increase so does the risk of default by borrowers, and the lenders (banks) would prefer to ‘play it’ safe and limit credit supplied.

The South African banking sector have proved to be stable and realizing a steady growth, albeit a minor shake witnessed during the global financial crisis era of 2008/2009. The extensive regulatory environment has put a strain on banks investing in toxic assets which helped the sector to survive the said financial crisis period. Deregulation of the sector have opened up room for competition, although the sector is still highly concentrated with the ‘big’-four banks, controlling the largest chunk of the sector assets. Dealing with the concentration issue will give room for improvement in the effectiveness of the banking sector. There is great need for the regulator to be wary of mergers and acquisition which may continue to swallow smaller banks thereby increasing the concentration.

2.2 Monetary policy regimes

Current monetary policy is very much influenced by SARB’s adoption of a formal inflation targeting monetary policy framework in February 2000. The monetary authorities now target the rate of inflation directly instead of following the previously applied ‘free’ monetary policy approach in which intermediate objectives played a prominent role. The response by banks to monetary policy shock may depend on the policy instrument being used, therefore for different policy frameworks the role of bank size may vary- from being of material to non material. Leiderman, Maino, and Parrado, (2006) noted that the way an economy responds to monetary policy is regime-dependent. A regime shift toward inflation targeting may gradually induce changes in the way economic agents react to policy signals, thus improving the efficacy of the monetary policy regime. Inflation targeting presents a clear anchor which helps underpin inflation expectations and also how monetary policy makers are supposed to communicate with the public increases policy transparency and greatly reduces macroeconomic uncertainties. This translates to confidence in monetary policy and therefore economic agents are willing to respond accordingly as they trust that there will not be any surprises or ambushes with regards to sudden policy changes.

Since the 1960s the South African monetary policy authorities implemented various broad frameworks (SARB, 2010), with expected differences in accentuating or dampening down the role of bank size in transmitting monetary shocks.

Liquid asset ratio-based system was the first, comprising quantitative controls over interest and credit until the early 1980s. According to SARB (2010), interest rate played minor part as a corrective instrument while the main form of monetary control was through liquid asset requirements. Commercial banks were required to hold specific assets deemed as “liquid” as a minimum proportion of deposits. Under this policy instrument, all banks would be affected proportionately- banks with more deposits have more reserves to set aside. This is alike with the current system where the repo rate is the same for all banks, to the extent that with differing size the response may also differ. Credit extension

during this period was under direct control- in this regard, needless of bank size; credit extended would be control directly.

During 1981 to 1985 a mixture of systems was experienced through the transition, following the De Kock Commission recommendations augmented by dissatisfaction with the liquid asset ratio system.

Similarly, between 1986 and 1998 eclectic approach dominated biased towards monetary targets. Explicit (pre-announced) monetary (M3) growth targets were announced annually and were to be achieved indirectly by adjusting interest rates (Bank's discount rate) to influence the cost of overnight collateralised lending and thus ultimately the market interest rates. Interest rate as cost of capital had the potential to determine borrowing. The move from money supply target as the anchor and intermediate objective was necessitated by its impotence render by liberalisation of the financial markets and the opening-up of the country from international participation leading to increased capital flows. If the SARB would limit money supply aggregates, the free capital flows would cover that gap and lending could easily be maintained. Targeting monetary policy therefore fails to account for the bank lending channel in this regard. And as a result, the monetary authorities moved to a broad range of intermediate targets. Repurchase agreement (Repo) system, M3 targets and informal targets for core inflation was the monetary policy regime of 1998-1999.

From 2000 to the present, a repo system with formal targets for CPIX inflation is followed. This involves explicit targeting of inflation. The use of a nominal anchor helps underpin inflation expectations, of which, if left unattended have the potential to translate to actual inflation woes (Mishkin, 2007). Inflation targeting as compared to other frameworks brought various advantages to the monetary policy stance. The framework fosters monetary policy transmission into all spheres of the economy and reduces macroeconomic uncertainty than any other previous framework. It removed uncertainties among public on the monetary policy stance being adopted by the authorities. This can be supported by the growth in money supply and bank credit extension in the 1990s which were above the guidelines of the authorities for a considerable period (SARB, 2010), with the public expecting an increase in short term interest rates.

Furthermore the framework improves coordination between monetary policy and other economic policies as long as the target is consistent with other objectives. This can ensure attainment of the intended objective by reducing loopholes within macroeconomic policy arena. This means there will be little room for lenders to manoeuvre in the face of monetary policy tightening as the same stance will be echoed from other spheres of the economy thereby resulting in monetary authorities achieving the intended outcome. If the outcome was to reduce bank lending, then it will be possible to do so.

Under the inflation targeting regime, the SARB uses interest rates; repurchase (repo) rates, as an instrument to effect monetary policy adjustments. If banks' supply decision alternate in line to changes in repo rate, then the banks have a role in passing through the impulses of monetary policy into the real economy. It is therefore necessary to understand if banks either amplify or

cushion the effects of the changes in repo rate. A good understanding of the speed of and extent to which changes in the central bank's interest rate instrument impact inflation is fundamental and lies at the heart of inflation targeting framework. With the uncertainties with regard to the transmission of monetary policy initiatives to aggregate demand and inflation, the analysis of the links between policy instruments and key economic variables is crucial to ensure that right policy measures are taken now to effect a specific outcome in the future (Dabla-Norris and Floerkemeier, 2006).

3 Literature Review

The leading theory in explaining credit markets imperfections and frictions and how they hamper spending within an economy is formulated in the Stiglitz and Weiss' (1981) model. The model is based on the understanding that lenders consider the financial fundamentals of borrowers' and their (banks') balance sheets before extending credit. Since Stiglitz and Weiss' credit rationing model, theory and evidence have shown that credit markets are not perfect, as asymmetric information problems lead to credit rationing. In other words the credit market matters. How banks respond to and adjust their internal strategies in the face of monetary policy shock will determine the impact and success of that policy. The operation of this channel mostly depends on the supply of loans and the factors that determine their course. In particular, a restrictive monetary policy leads to a reduction in bank reserves and deposits and, consequently, to a fall in loan supply.

Most notably, Bernanke and Blinder (1988) argue that the existence of a bank lending channel for monetary transmission is based on the premise that the supply of non-deposit sources of funding for banks is not infinitely elastic. In their IS/LM-type model, banks are not able to replace non-remunerated deposits, which contract in response to a monetary tightening, with alternative sources of funding, such as certificate of deposits or new equity, or to decrease their bond holdings.

The changes in repo rate affects asset prices (a rise in repo rate reduce asset prices) and other market interest leading to more interest expense payable. An increase in repo rate (monetary policy tightening) reduces the value of assets increasing the value for liabilities and as a result weakening the financial fundamentals of the borrower, exposing the lender to great default risk. To avoid more default due to adverse selection and moral hazard problems, lenders restrict the quantity of credit extended at the prevailing interest rates, that is, credit rationing.

Under the credit rationing model, banks do not change the price for the loans after a change in repo rate; rather they vary the quantity available to lenders. Banks rely on deposits to accumulate reserves which they utilize to loan out to firms and individuals, a change in repo rate affects banks' reserves and at the end the quantity of loans supplied. In this case, credit limits become a function of the financial strength of both borrowers and lenders- as the financial strength

of all agents vary over the business cycle the role of credit constraints can thus be operative. The Stiglitz and Weiss model argues that the return to lenders is more complex than simply the nominal interest rate, and that the risk of default must be incorporated. It has been argued earlier that increases in the interest rate increase the risk of default, so that returns to the bank (R) as a function of interest rates (i) can be illustrated as in Figure 2.

An increase in interest rates, which raises the risk of default on new and existing loans, reduces the return to the bank and rates will not be raised. There is thus a persistent disequilibrium in the credit market with excess demand for loans at i^* - this could (in principle) be eliminated by increasing the interest rate to i_1 but the banks are neither willing to do this nor to provide the additional loans. The model is extended by Stiglitz and Greenwald (2003) who showed that any shock to the financial position of the banks themselves could lead to a reduction in lending, and indeed calling up of existing loans. Falling asset prices would simultaneously reduce the wealth, and increase the relative riskiness, of the banks' asset portfolios (assuming that assets other than loans are relatively less risky than the loan portfolios). Banks would respond by reducing the number of loans outstanding and/or making smaller advances to bring overall risk back into line, *ceteris paribus*. If there is a monetary shock, for example, a contraction reflected by a rise in repo some sequence of events may occur which will ultimately lead to the decline in credit extension. Firstly banks will want to cut back on their lending and, for the reasons outlined above, will restrict lending at existing interest rates by imposing credit limits on individual borrowers rather than increasing interest rates. This will be disproportionately focused on small borrowers who are generally more risky - these are the most financially fragile borrowers (SMMEs, for example) who will suffer the greatest relative falls in net worth and experience more volatile cash flows. The reductions in credit lead to (further) reductions in investment and consumption spending and magnify the contraction in output. It is important to note, at this point, that monetary policy will only be effective to the extent that it directly reduced the volume of credit (quantity of loans supplied) rather than simply raising the price (interest rates).

Walsh (2003) extends the analysis of Bernanke and Blinder (1988) and analysed the conditions under which the loan supply might be perfectly elastic. The study considers the portfolio decisions of a representative bank that maximises profits. It concludes that if loans and demand deposits are complements in the bank's cost function, then a change in reserves that lowers deposits may directly increase the cost of loans, leading to a shift in the loan supply function. The shift in the loan supply function would represent a distinct bank lending channel leading to a drop in loans.

Ehrmann et al. (2003) developed a model of the loans market that again base on the arguments of Bernanke and Blinder (1988). It came up with an equation for bank loans that relates the response of bank loans to monetary policy both directly (through the money channel) and to the bank characteristics (the lending channel). The study achieved this by adding an explicit demand function for nominal bank loans (introducing aggregate variable like output and

prices) and by considering that banks are perceived to be risky (which leads to the supplier of non-deposit banks demanding an external finance premium).

The bank lending channel theory ascribes a special role to banks in the monetary transmission mechanism. It stipulates that the tightening of the monetary policy can affect not only the demand for loans (through the interest rate channel), but also the supply of bank loans, which in turn, further influences investment and consumption. In other words, monetary policy affects not only borrowers, but also banks. The role of banks is important as it addresses the problem of information asymmetries in the credit market (Jimboean, 2008).

As noted by Knoop, (2008:161), “New Institutional theories illustrate how monetary policy can affect the economy in ways other than through its influence on interest rates (interest rate channel)... how changes in monetary policy affect the financial fundamentals of borrowers and lenders, changing perceived risk that then affects the level of credit (credit channel)”. Figure 3 attached gives a diagrammatic illustration of the main channels of monetary policy transmission. Distinguishing the presence and relevance of the channels for monetary policy transmission is useful for three main reasons: Firstly it provides an understanding of the links between the financial sector and the real sectors of the economy through knowing which financial aggregates are impacted by changes in interest rates. Secondly more information about the transmission mechanism channels might lead to better choice of targets; and lastly it will help policy makers interpret movements in financial aggregates more precisely. This research will focus on bringing out the role of banks (size) in the transmission of monetary policy by attesting the presence of the credit channel, in particular the bank lending channel.

According to (Knoop, 2008), new institutional theories of finance share the argument that, analysis of financial activity, requires primary focus to be on the provision of credit and not just on the total amount of liquidity or the money supply. The willingness to extend credit is crucial and thus perceived default risk plays a crucial role in determining credit. Adverse selection and moral hazard problems due to inherent asymmetric information challenges are important factors in determining the supply of credit, the poorer the information available on a borrower; the more likely it is that a lender will limit the borrower’s credit. Knoop further argued that, one of the important functions of banks is to overcome these problems and obtain information about small borrowers so that they can obtain sufficient credit. The borrowers, who need credit most, find themselves unable to access credit due to lack of established credit history, and lack resources to provide large volume of financial information to lenders. This means that the more banks are efficient in monitoring borrowers and developing long-term relationships with borrowers the lower the probability of them reducing credit extension to these smaller players. This is known as relational lending, according to Carrasco and De Mello (2008).

The above theoretical literature review assigns an inimitable role to banks in the monetary policy transmission; however it is necessary to review empirical works on the subject to identify what have been concluded thus far, if any.

Bernanke (1983), carried out a study on the causes of great depression in the

United States of America (U.S), and attributed its depth and persistent to the crisis experienced by the U.S banking sector. Banks play a critical role in the effectiveness of an economy; it is due to their role in transmitting the monetary policy impulses to the rest of the economy. The findings support the notion that ‘banks matter’.

Kayshap, and Stein, (1993) investigated how financial markets and bank lending responds to changes in the money supply. They interpreted the results as that, an increase in repo rate by the central bank, will raise costs of credit intermediation forcing high quality borrowers to move away from banks leaving lower quality borrowers to compete for bank credit at costlier terms. When these lower quality borrowers get the loan, they are likely to default and worsen the financial fundamentals of the banks leading to lesser credit extension. This constrains small firms with weaker financial fundamentals most as compared to large borrowers who can afford to source funds elsewhere. On that, Gertler and Gilchrist (1994) showed that small firms which are more likely to be credit constrained are hurt more by tight monetary policy than are large firms which are unlikely to be credit constrained. Small firms contribute immensely to the South African economy through job creation and supply; their failure will have great repercussions to the whole economy.

Given this; the main question could be on the role of bank characteristics in influencing the nature of the overall role played by banks in transmission of monetary policy. Bank characteristics such as size, capitalisation, liquidity as indicated by Kayshap and Stein (1994) and competition among the banks play crucial role in the bank’s ability to cushion or accentuate the monetary policy shocks.

Peek and Rosengreen, (1995) pointed out that, the argument that banks are an important element in the transmission process is not an issue, because monetary policy operates through the banking sector, rather the description of the exact role played by banks is contentious, with debate focusing on the importance of bank lending distinct from the generally accepted channel operating through the interest rates. The contention has engulfed the sole significance of bank size as a good differentiating characteristic among banks.

According to Oliner and Rudebusch (1995) and Apergis and Alevizopoulou, (2011), three necessary conditions for the credit channel to have economic power can be identified. First, firms should not be perfectly indifferent to the different types of finance. They should be dependent on bank loans and not be able to replace losses of bank loans, due to decreases in loan supply by the monetary authorities, with other types of finance. If firms are indifferent between the two types of financing, then the decrease in supply of loans does not affect them at all. Second, the central bank should be capable of affecting the supply of loans through the changes it imposes on the volume of reserves. For example, in the case of a restrictive monetary policy, banks must not be capable of offsetting the decrease in funds from deposits by raising funds from other sources. The third condition that should be satisfied is that there must be some imperfections in the adjustment of the aggregate price level. The imperfect adjustment in prices is necessary because monetary policy would have no impact if prices could adjust

by the same percentage every time money supply changes.

Different empirical works have been done on ways through which the monetary policy affects the economy. Bernanke and Gertler, (1995) affirm that the gaps in the conventional story had led a number of economists to explore whether imperfect information and other ‘frictions’ in the credit markets could help explain the potency of monetary policy. Bank lending channel stresses that in an economy where at least some borrowers are bank-dependent, the existence of financial frictions should give banks an important role in the monetary transmission mechanism.

The relevance of the credit channel has been affirmed by Mishkin (1996) when he argued for the existence of a large body of cross-section evidence in support of the notion that credit market imperfections of the type central to credit channels, does really affect firms’ employment and spending decisions. The credit channel consists of bank lending channel and balance sheet channel.

According to Freixas and Rochet (1997), money stock is actually less important for macroeconomic performance than the financial capacity of the economy. They defined financial capacity as the aggregate volume of credit that lenders are ready to grant to borrowers. The question of whether changes in monetary policy results merely in changes in the cost of capital (the money view) or whether changes in monetary policy has broader and more far reaching implications for the process of financial intermediation (credit view), has come to the fore in both academic and policy arena, with this paper contributing to that debate.

Kishan and Opiela (2000) argued that the accurate definition of the role of banks in the transmission of monetary policy may hold the key to explaining the effects of the policy on the economy. They concluded that banks play a pivotal role in the transmission of policy and credit channel accounts for the role of banks in transmitting central bank impulses. Traditionally the monetary policy stance was argued to be transmitted to the rest of the economy through interest rates (interest rate channel), but currently more channels have been suggested, which are not meant to replace the traditional view but rather to augment it.

Moreso, understanding which characteristic(s) play a central role is important in determining how policy makers could take advantage of these characteristics when designing their monetary policies. Pruteanu, (2004), found a stronger influence by bank capitalisation and liquidity but a weaker impact attributable to bank size variations on bank loans in Czech Republic. This further highlights the contention on the strength of the impact (if any) of bank size on lending behaviour.

Approximating informational frictions by size, liquidity and capitalisation of banks under the panel structural approach (as with Kayshap and Stein (1995)), Kohler, Hommel and Grote (2005) concluded that the presence of bank lending channel in the Baltic States is caused mainly by differences in liquidity. The research made use of the Ordinary Least Squares method of estimating the results. The study indicated that the reaction of banks to changes in interest rates does not depend on single bank characteristics, but rather on a combination of various characteristics. Their strong conclusion was that bank size does

not significantly influence the lending behaviour of banks, due to the fact that liquidity and capitalisation have counterbalancing effects. This is supported by interest rate changes which are, on the one hand, less strongly felt by small and liquid banks.

On the other hand, utilising dynamic panel estimation methods Sichei (2005) showed that bank lending channel exist in South Africa. The study employed dynamic data approach to test how bank characteristic in the form of capital adequacy and bank assets (size) in South Africa affect the response of loan supply after a change in monetary policy. The study found out that bank size and capitalisation have significant impact on bank lending, conforming to the findings in the US: Kashyap and Stein, 2000, Kishan and Opiela, 2000. There is however need to test the impact of bank characteristic on lending behaviour taking into account the global financial crisis era of 2008/2009. This is motivated by the argument that bank lending constrains are more prevalent during financial crisis. Therefore, businesses and consumers, who depend on bank lending, reduce their purchases of durable goods and purchases of capital for investment and, hence, output is also affected in a negative way (Golodniuk, 2006). The findings if agreeing to the ones of Sichei, (2005) help affirm the conclusions on role played by banks in the transmission of monetary policy in South Africa.

Meltzer, (2007) found that banks alter their loan supply when confronted with monetary shocks and that output is unaffected by loan supply. To investigate the importance of loan supply on economic activity the researcher tried to answer two questions: firstly do monetary shocks have an effect on loan supply in the euro area: and secondly does bank loan supply affect output? The results do not support the existence of bank lending channel, though admitting that previous studies supports the balance sheet channel.

Juurikkala, Karas and Solanko, (2009) concluded that, changes in monetary policy lead banks to change their loan supply. Their results showed that the strength of the lending channel depends on a bank's capitalisation, thereby implying that well capitalized banks face smaller informational frictions. In this regard the banks will have easy access to alternative financing sources in times of monetary contraction. Large panel of all Russian Banks covering 1999-2007 and dynamic panel data methods were used. Bank lending channel exists in Russia. The test was on the significant for the interaction of the bank characteristics with the monetary policy indicator. Measures of bank characteristics used include bank size, capitalisation and liquidity. The research also concluded that, contrary to most studies on the US (Kashyap and Stein, 2000, Kishan and Opiela, 2000) or euro area, bank liquidity and *bank size* are not significant in explaining bank lending, noting that capitalisation and bank size are negatively correlated, (well-capitalized banks tend to be very small as measured by total assets). This conclusion 'heats-up' the contention on whether bank size alone really influences bank lending. Their overall findings based on bank size reflects those recorded in Kohler, et al. (2005) albeit grossly contradicting researches on the US and Euro area.

Few studies have focused on providing a theoretic and empirical description

of the role of banks in the single and emerging market economies like South Africa. In pursuit of identifying proper monetary targets, consideration of the role of banks is crucial. Others argue that the South African financial markets are sophisticated and competitive to the extent of minimizing the relative importance of bank finance. As highlighted by Knoop, (2008:161), "... financial development has reduced the relative importance of bank finance and created more competitive and globalised financial markets that may act to minimize the real effects of changes in the money supply". The analysis of this paper will help check if empirical evidence can attest this.

Knoop, (2008) further claim that the ability to explain the fundamentals behind why changes in the money supply have real effects on the economy is crucial to understanding both the potential power of monetary policy and whether monetary policy can be used to effectively stabilize output and smooth business cycles. A lucid understanding of the empirical implication of conducting active monetary policy is crucial regarding the relationship between central bank instruments and economic variables such as employment, output and inflation.

Chibundu, (2009) asserted that most researches accept the existence of a standard channel through interest rates, with contention however on the role of financial intermediaries, in particular banks. This paper examines the role of banks (financial intermediaries) in order to contribute to the debate in favour of the high significance of banks in the transmission of monetary policy.

This research aims to articulate the theoretic and empirical description of the role played by banks in transmission of monetary policy in South Africa, with particular reference to size as a bank differentiating characteristic. The need to focus on bank size as a distinguishing attribute is motivated by the highly concentrated South African banking sector and that past researches do not always agree on the real effects of this characteristic as conclusions in Pruteanu, (2004), Kohler et al. (2005) versus those in Kashyap and Stein, (2000), Kishan and Opiela, (2000). Empirical evidence will be used to test the presence of bank lending transmission channel, the presence of which attest the importance of banks in the transmission of monetary policy. Banks vary in terms of size, capitalisation and liquidity; these characteristics ought to be tested from bank to bank, as they may differentiate how banks help transmit the monetary policy.

Accommodating the heterogeneity among banks, allows us a closer scrutiny on which particular characteristic the policy makers can influence and induce effect on the transmission by banks. In this paper, to analyze the cross-sectional differences in the effectiveness of the lending channel, a test based on panel data, taking into account the bank-specific characteristic of size is adopted. Past researches focusing on South Africa, for example, Sichei, (2005) have used the bank-specific characteristics of capitalisation and size, but it covers a period of 'easy' credit. This research will focus on investigating how bank size in particular impact bank loan supply for the period 2000 to 2009, a period which includes the global financial era of 2008/9 ('hard' credit time).

Both theoretic and empirical evidence confirm the significant role played by banks in the transmission of monetary policy through the bank lending channel. The idea that bank market structure can affect the effectiveness of monetary

policy was initially developed by Aftalion and White (1977) and subsequently by Vanhoose (1983), as cited in (Blei 2007). Blei concluded that credit market structure is relevant to monetary policy in the short run and in the case where creditors cannot screen out bad borrowers it also affects the robustness of the credit market to contractive monetary policy. The degree of differentiation among banks determines the effectiveness of monetary policy. Blei, (2007) argued that the greater the extent of credit market differentiation, the weaker the intensity of transmission, or, alternatively, the larger the change in monetary policy required to achieve a given real effect. (Few researches have been done for South Africa under this theme, therefore this research aim to cover the gap in empirical description of the role of banks in transmitting South African monetary policy.

4 Methodology, Estimation and Results

4.1 Methodology

The underlying assumption is that all banks face identical loan demand and therefore the demand for loans do not vary with bank characteristics.

The model used here is adopted from Juurikkala et al. (2007) on the investigation of role of banks in the transmission of monetary policy in Russia, with some modifications.

In equilibrium money demand (D) equals money supply (M) and money demand depends on monetary policy (RR):

$$D = M = -\theta(RR) + y \quad (1)$$

Loan demand (L_d) depends on real GDP (y), price level (p) and the loan interest rate (r)

$$L_d = \theta_1 y + \theta_2 p - \theta_3 r \quad (2)$$

The supply of loans (L_s) depends directly on the amount of loanable funds (deposits or money) D available, the loan interest rate r and the monetary policy stance (RR):

$$L_s = \theta_4 D + \theta_5 r - \theta_6 (RR) \quad (3)$$

Monetary policy approximated by the repo rate, enters the loan supply function both directly, through the opportunity cost for a bank that uses interbank markets to finance loans, and indirectly as the amount of deposits available depends negatively on the interest rate.

The impact of deposits on loan supply depends on bank characteristics X_i , as assumed by Erhmann et al. (2001), cited in Juurikkala et al. (2007). Assuming that banks are not similarly dependent on deposits, we model the impact of deposit changes to be lower, the higher the bank characteristic; size. Therefore

$$\theta_4 = \mu_0 - \mu_1 X_i \quad (4)$$

In this study bank characteristics X_i will be defined by individual bank size- only one characteristic is taken from a pool of commonly used characteristics which includes liquidity, capitalisation and ownership. The greater effect of bank size will mean that the structure of the banking sector- the oligopolistic nature is significant in influencing the transmission of monetary policy.

Based on the four equations above, and assuming loan market equilibrium, loan supply function can be defined as:

$$L = ay + bp - c_0rr + c_1X_i rr + dX_i + e \quad (5)$$

The coefficient (c_1) combines the loan supply effects of monetary policy and individual bank characteristics under a particular banking sector structure. A significant c_1 would imply the existence of a bank lending channel, meaning banks responds to changes in the repo rate in a way that will affect their supply for loans. This result will give the banks a significant role in the transmission of monetary policy. Given our basic assumption, θ_3 is equal for all banks. This assumption is crucial to allow the identification of the monetary policy effects on loan supply.

The model is estimated in first differences, with the regression model specified as:

$$\begin{aligned} \Delta \log [(L_{it})] = & \sum_{j=1}^l aj \Delta \log [(L_{it-j})] + \sum_{j=0}^l b_j \Delta rr_{t-j} + \sum_{j=0}^l c_j [[X]_{i,t-1} \Delta rr_{t-j}] \\ & + \sum_{j=0}^l [d_j \Delta \log (GDP_{t-j})] + \sum_{j=0}^l e_j \varphi_{t-j} + f X_{i,t-1} + \mu_i + \varepsilon_{it} \quad (6) \end{aligned}$$

Where $i = 1 \dots, N$;

$t = 1 \dots, T$;

N denotes the number of banks;

T denotes the total number of quarters and

l denotes number of lags

L_{it} are loans by bank i at time t to private non-banking sectors;

RR denotes the monetary policy indicator, the repo rate in South Africa;

GDP is the real gross domestic product;

φ - the rate of inflation

X_i bank specific characteristics

μ_i - Individual bank effects;

$\varepsilon_{i,t}$ - error term

Parameters to be estimated: a, b, c, d, e and f .

To test for the existence of distributional effects of monetary policy among banks, we use the (X) bank size. This indicator is used by the large majority of studies in this area. In this study focus is on investigating if size as bank characteristic has a significant influence on the transmission of monetary policy and if it can appropriately discriminate banks in South Africa according to their external finance cost. There is no empirical consensus on the significance of this characteristic in terms of its appropriateness to discriminate banks.

Due to asymmetric information problem, small banks can have more difficulties in raising non-deposit funds to offset monetary policy tightening and keep the supply of loans at a desired level. In other words, after monetary policy tightening, small banks reduce lending more than larger banks, (Kashyap and Stein, 1995).

4.2 Variable Descriptions

The dependant variable in this study is bank loans. Most loans are granted at market interest rates, thus these loans are apparently, more sensitive to changes in monetary policy. The data on loans supply by banks have been extracted from individual balance sheets as provided on the SARB website. Since the data is presented in monthly, this was converted into quarterly data of loan supply by the individual bank. This quarterly panel data is compiled for the first quarter of 2000 to the last quarter of 2009.

The monetary policy indicator adopted is the repurchase rate (repo rate) which is a short term interest rate charged by the central bank to banks when borrowing. The central bank's policy rule embodies its response to deviations in macroeconomic variables in order to achieve its ultimate policy objectives. The SARB uses the repo as a monetary policy tool (to signal its monetary policy stance) to ensure price stability; therefore this variable is ideal in modelling monetary policy in South Africa. The repo rate figures as obtained on the SARB website (historic data) were used as a proxy for the South African monetary policy action. The changes in repo rate may at some time tally with the quarters used in this research, therefore an average of different rates during the quarter were added together and averaged to get the figure to be used for a particular quarter.

The bank characteristic measure, size is calculated as:

$$Bank\ size = \log A_{it} - \frac{1}{N_t} \sum_i \log A_{it} \quad (7)$$

Size is log of total assets in nominal rand terms. This measure indicates banks health that affects the external finance premium, (Sichei, 2005). The measurement criterion is normalized with respect to their average across all banks to eliminate the possible trends in bank characteristics. The data for total individual bank assets was obtained through the SARB online statistical query. The logarithm of the assets values per quarter was used to represent an individual bank size, therefore being able to differentiate among banks.

Demand for loans is captured by the growth rate of GDP and the inflation variable as in Gambacorta and Mistrulli, (2003); since information about the customers of each particular bank is not available. Gambacorta and Mistrulli, (2003) and Jimborean (2008) argue that the introduction of these two variables enables capturing of cyclical movements and serves to isolate the monetary policy component of interest rate changes. On the other hand, from credit demand perspective, Gattin-Turkalj et al. (2007) asserts that GDP growth

increases demand for loans via income effect and the wealth effect. Gattin-Turkalj et al. (2007) added that improving overall economic conditions (GDP growth) and growing optimism by consumers and enterprises leads to an increase in demand for loans as favourable economic conditions and prospects stimulate consumption and investment demand, thus increasing the demand for credit. Quarterly Gross Domestic Product (GDP) figures were extracted from SARB website in quarterly format and Consumer Price Index (CPI) figures obtained from the same source were used as a proxy for price level changes (inflation).

The model allows for bank-specific effects (μ_i), (Gambacorta and Mistrulli, 2003). The parameters of interest are those in front of the monetary policy indicator (b_i), which capture the general impact of the monetary policy changes on the growth of bank lending, and the coefficients in front of the interaction terms (c_i). The latter serves to assess whether the considered bank characteristic makes any difference in the way banks react to monetary policy changes, (Jimboean, 2008). A positive and significant parameter (c_i); is equivalent with the assumption that smaller banks react more strongly to monetary policy changes. According to Baum et al. (2008) this implies that the effect of contractionary monetary policy will be strongest for the smallest banks, while the largest banks will be less sensitive, since they have better access to the market for uninsured funds. The coefficient in front of the bank characteristic (f) has an illustrative role; it describes whether there is a linear relationship between the growth rate of loans and the bank characteristic, (Pruteanu-Podpiera, 2007 and Jimboean, 2008).

The main sources of the data are the South African Reserve Bank website, Statistics South Africa, and individual banks websites. Data on Repo rate, real GDP growth rate, number of banks, was obtained solely from SARB, while total bank assets and total bank loan supply was found by relating the data from SARB and individual banks websites. Linking the data from SARB and individual banks enabled us to have complete series for the two variables. Consumer Price Index was obtained from Statistics South Africa databank.

The analysis covers commercial banks registered in South Africa as indicated in the information available on SARB website as at year 2010. The population becomes 18 registered banks in South Africa as discussed under section 2 above. However, our sample follows South African registered commercial banks over 10 years (2000-2009). A sample of South African controlled commercial banks was selected in contrast to Sichei, (2005) who used all registered banks in South Africa. The choice of our sample was mainly influenced by existence of the specific bank for the entire study period. Some banks were registered whilst others deregistered during the study period, but effort was done to track those banks that were consistently in operation over the entire period, giving us a total of seven banks, namely: African Bank Limited,

FirstRand Bank Limited, Imperial Bank Limited, Investec Bank Limited, Nedbank Limited, Sasfin Bank Limited, and Standard Bank of South Africa Limited. In addition, ABSA was included in the study to give a sample of eight

and is the only local bank with a significant number of foreign shareholding⁵ in the sample. According to the SARB (Bank Supervision Report: 2009), shareholding by foreigners in 2009 represented about 47,5 percent of total nominal banking shares in issue, and the large portion of foreign shareholding can be mainly attributed to the large stake that Barclays Plc has in ABSA. Inclusion of ABSA was influenced by its significance in the South African banking sector and economy, being among the big four banks and by the possible cushion presented by its foreign major shareholder⁶. With respect to assets value, ABSA is also the second largest bank in South Africa after Standard Bank, (SARB, 2010). Thus, the sample conveniently allowed a combination of equally small and big banks, as regarded in the banking sector, as per Table 4 attached.

We first estimate the benchmark model which will set a 'standard' for our estimation, and does not include the bank characteristic (X) and the interaction between the bank characteristic and the monetary policy indicator $[(X)_\downarrow(i, t - 1) * \Delta[r_r]_\downarrow t)$. The equation will be referred to as 'standard model'. This gave us a preliminary insight into whether the growth rate of client loans responds to monetary policy shocks and to macroeconomic conditions. The benchmark is also essential for robustness checks. The full model was estimated after the standard model.

Following Jamborean, (2008) the reduced span of time constricts us to estimate equation (6) for the current period without using lags. In this case, it was possible to estimate the full/complete model and the standard model using General Methods of Moments (GMM) method. We used the GMM method because of the inclusion of the lagged dependent variable as explanatory variable-this will overcome the problem of right hand regressor being correlated with the error term and thus rendering OLS estimation biased and inconsistent, (Han and Phillips, 2010), (Gujarati, 2011). Providentially, this method accounts for the potential endogeneity of some variables, which is likely in the case of our bank characteristic (size). The instruments for the lagged dependent variable are their own lagged values in levels with a one-lag window. This is highly crucial in panel studies as it also generates efficient estimates in the presence of heteroskedasticity of unknown form. According to Baum et al. (2003) the usual approach today when facing heteroskedasticity of unknown form is to use the GMM, introduced by Hansen (1982). Baum, et al. (2003) further argued that, GMM makes use of the orthogonality conditions to allow for efficient estimation in the presence of heteroskedasticity of unknown form. Carrera, (2011) argued that the differencing procedure ensures efficiency and consistency of the estimates, provided that instruments are adequately chosen to take into account the serial correlation properties of the model.

⁵On 27 July 2005 Absa became a subsidiary of Barclays Bank PLC ("Barclays"), when Barclays acquired a controlling stake in the Absa Group. Barclays holds a stake of **55,5%** in the Group; Available Online: <http://www.absa.co.za/Absacoza/About-Absa/Absa-Group/Absa-Overview>; Accessed 09 June 2012

⁶Barclays is a major global financial services provider engaged in retail and commercial banking, credit cards, investment banking, wealth management and investment management services with an extensive international presence in Europe, the USA, Africa and Asia; *ibid*

4.3 Estimation and Results

The changes in monetary policy were expected to exact a direct influence in the level of rand-denominated bank loans. In this study existence of bank lending channel should be indicated by a positive and significant coefficient of the interaction term. According to Sichei, (2005), a non-significant coefficient may indicate either absence of bank lending channel or that the chosen bank characteristic does not appropriately discriminate banks in South Africa according to their external finance cost. The existence of bank lending through size as the discriminating factor was tested against these guidelines.

The GMM regression results obtained are presented in Table 3 attached. Under all models: namely the standard, the complete and the complete with bank specific effects model, GDP has the expected positive and significant relationship with bank loan supply. The results are robust and indicate that a one percentage point increase in the real GDP growth rate leads, on average, to a 0.62 to 1.84 percentage points' increase in the nominal growth rate of loans. The coefficients are highly significant and support the view that an increase in real GDP will call for more real investment spending in order to meet the increase in aggregate demand and maintain the equilibrium.

All the three models reveal a negative relationship between monetary policy and bank loan supply. The parameters are statistically significant and exhibit a considerable influence of monetary policy actions, especially a strong influence is shown in the benchmark model. The coefficient in the complete model compares favourably with that of other findings, such as Koehler et al. (2005) and Juurikkala et al. (2007). The bank characterizing variable is also significant and linearly related to the nominal loan growth rate. The positive sign of the bank size variable indicates that the loan growth rate is on average higher for large banks. Smaller banks are vulnerable to information asymmetries and do not lend much, maybe their liquidity and capitalisation also contribute to this.

The price level coefficient is positive as expected, and significant. The positive contribution will be explained as the influence of inflation on nominal values of loans supplied. The amount demanded is determined by the cost of investment, which in a way takes into consideration inflation component in its nominal figures.

In order to find out if monetary shocks have distributional effects on the banks in South Africa, the domestic monetary policy indicator (repo rate) is subsequently made to interact with the discriminatory bank variable (size). As bank credit is negatively related to interest rate movements, the coefficient of the interaction term between monetary policy indicator and bank characteristic (size in this study) was expected to be positive and significant. The results of these regressions are also presented in Table 3. The interaction term turned out to be positive, however insignificant. The sign of the coefficient (c_i) can now be used to assess the existence of asymmetries across banks in their reaction to a monetary policy tightening. The positive coefficient on the interaction of the monetary policy indicator (RR) and bank size (SZ) means that smaller banks react more strongly to changes in the interest rate.

The above finding supports theory that smaller lenders lack adequate resources, expertise and economies of scale for monitoring clients. As stated in De Haan (2003:298) and Ghosh (2006:4) Kashyap and Stein, (1995) asserts that small banks encounter more asymmetric information problems on the capital market than large banks and may find it more difficult to raise uninsured funds in response to a monetary tightening. This remark affirms the existence of bank lending channel in South Africa, by corresponding to the idea that lending supply of smaller banks should be more sensitive to interest rate setting behaviour.

When cross section effects, that is, bank specific effects, are allowed the considered bank characteristic (of size) proved to make significant difference in the way banks react to monetary policy changes. The positive and significant parameter (c_i) in the complete model allowing for these effects (see Table 3 attached), supports the assumption that smaller banks react more strongly to monetary policy changes. These results assert the existence of bank lending channel and particularly the significance of bank size as an appropriate differentiating characteristic among banks in South Africa. The improved significance of the parameter, (c_i) after allowing for bank specific effects indicates that the environment under which the banks operate are diverse (that is, for example, differences in management styles, reputation).

The adjusted R-squared, though ranging from a very low 0.06 to a high 0.75, are in line with other studies on the bank lending channel in Central and Eastern Europe (Schmitz, 2003), and in the Baltic region (Koehler et al., 2005). These values are generally acceptable with panel data. Inclusion of bank characteristic improves the fit of the regression. The Durbin-Watson statistic (d-statistic) is however low, being 0.04 in benchmark model and rising to 0.12 in the complete model, showing the relevance of bank size in explaining bank loan supply in South Africa. A low value for the d-statistic implies that the model errors are correlated, its improvement in our complete model attest the hypothesis that size can appropriately discriminate banks in South Africa as its inclusion increases the model fit. The coefficients of interest are all significant, demonstrating the existence of bank lending channel in South Africa. This supports the findings by Sichei, (2005) on South Africa where capitalisation and bank size were used as the differentiating characteristics.

5 Summary and Conclusion

The presented study has focused on one of the channels of monetary transmission, namely the bank lending channel, under the credit view. This transmission channel stresses the role of asymmetric information that forces banks to reduce the supply of loans in response to a restrictive monetary policy shock. Bank characteristics and the structure of the banking sector influence the extent to which loan supply has to be reduced and therefore determine the strength of the bank lending channel. According to theory, larger banks react less strongly to restrictive monetary impulses as well as banks in oligopolistic markets. In South Africa there are 'big four' banks which are larger and control greater chunk of

the market- therefore the market can be viewed as concentrated.

Estimations show that changes in monetary policy significantly affect bank lending. This indicates that most loans are denominated in local currency and the repo rate is a good proxy for monetary policy in South Africa. The estimations further indicated that nominal GDP has a positive and significant influence on loan supply. This goes along with the notion on increased investment spending during expansions phases of the economy cycle.

The results further indicate that bank size affect loan supply. Smaller banks tend to cut back more on loan supply than bigger banks in the face of a contractionary monetary policy. The regression results moreover suggest that distributional monetary policy effects can be attributed to differences in size. The study concludes that size do appropriately discriminate banks in South Africa according to their external finance cost. Lending of bigger banks is impacted less by monetary policy changes, therefore, they are less prone to vary lending patterns when the monetary policy changes. Thus, banks play a pivotal role in the monetary policy transmission in South Africa. This is so, due to the established existence of the bank lending channel. However the current inflation targeting monetary policy framework has the potential to dilute this supremacy given its macroeconomic policy coordination and uncertainty reduction advantages. Inflation targeting framework reduces macroeconomic uncertainties and thus economic agents consider the direction of monetary policy over the one of individual banks. For example, during a monetary policy tightening, economic agents borrow less even if there are banks lending out more- monetary policy is more informative when it is transparent.

Highly concentrated industry signifies oligopoly and if not well monitored can lead to price collusion by the few giants at the detriment of other participants and customers at large. There is need to determine the benchmark H-Index level to help monitor assessment of mergers and acquisitions within the banking sector. This is crucial in order to set levels of competition required to bring efficiency by making the sector more contestable.

The results have policy implications on deals between local banks and international giants like the foiled transaction pitting Old Mutual, Nedbank and HSBC. If bank size matters in the transmission of monetary policy in South Africa- especially as larger banks can be able to cushion the effects of monetary policy, the regulating body must be wary of huge acquisition of South African banks by foreign banks and bank mergers within the domestic circles. If banks are large to cushion or accentuate the monetary policy effects, then the central bank may fail to stabilize the economy or reach its intended objectives. Every acquisition and merging transactions must be therefore permitted with this in mind. Monitoring and dealing with the levels of banking industry concentration will give room for improvement in the effectiveness of the sector.

References

- [1] Aftalion, F. and White, L. J. (1977), **A study of a monetary system with a pegged discount rate under different market structures**, *Journal of Banking and Finance*, 1(4), pp. 349-371.
- [2] Apergis N., and Alevizopoulou, E., (2011), **The Bank Lending Channel and Monetary Policy Rules: Evidence from European Banks**; *Int Adv Econ Res DOI 10.1007/s11294-011-9328-x* ; *International Atlantic Economic Society 2011*.
- [3] Arellano, M., and Bond, S. (1991), **Some Tests of Specification for Panel Data: Monte Carlo Evidence and Application to Employment Equations**; *Review of Economic Studies*, No. 78, pp. 277-297.
- [4] Badunenko, O., Deva, S., Schäfer, D., and Viertel, M., (2009), **What's banking sector concentration got to do with Private Equity market?**, Working Paper D.3.4.
- [5] Bank of England, (1999), **Monetary Policy in the United Kingdom**, Fact Sheet. Available Online: www.bankofengland.co.uk [Accessed: 22 June 2010].
- [6] Baum C. F., Schaffer, M. E., and Stillman S. (2003), **Instrumental variables and GMM: Estimation and Testing**; Working Paper No. 545 February 2003.
- [7] Baum C.F., Caglayan M., and Ozkan N (2008), **The role of uncertainty in the transmission of monetary policy effects on bank lending**; No 561, Boston College Working Papers in Economics from Boston College Department of Economics, Available Online: <http://fmwww.bc.edu/EC-P/WP561.pdf> , [Accessed, 10 June 2012].
- [8] Bernanke, B., (1983), **Non-monetary effects in the propagation of the Great Depression**; *American Economic Review* 73, 257-66.
- [9] Bernanke, S. B., and Gertler, M., (1995), **Inside the Black Box: The Credit Channel of Monetary Policy Transmission**; *Journal of Economic Perspectives*- Vol. 9, No. 4- Fall 1995, Pgs 27-48.
- [10] Blei, S., (2007), **On the Relevance of Credit Market Structure to Monetary Policy**; Working Paper 2007-03: Federal Reserve Bank of St. Louis.
- [11] Carrasco, V., and De Mello J. M. P., (2008), **A Relational Theory of Relationship Lending Under Contractual Incompleteness**; Department of Economic; Texas Discussion Paper No. 520.

- [12] Carrera, C. (2011), **The bank lending channel in Peru: evidence and transmission mechanism**; Paper prepared for the 2nd BIS CCA Conference on “Monetary policy, financial stability and the business cycle” Ottawa, 12–13 May 2011.
- [13] Chibundu, E. C., (2009), **Evidence of Bank Lending in Emerging Market Economy** Department of Trade and Industry, South Africa.
- [14] Dabla-Norris E and Floerkemeier H, (2006), **Transmission Mechanisms of Monetary Policy in Armenia: Evidence from VAR Analysis**; **IMF Working Paper** Middle East and Central Asia Department.
- [15] De Haan, L (2003), **Microdata Evidence On The Bank Lending Channel In The Netherlands**, *De Economist* 151, No. 3, 2003.
- [16] Erhmann, M., Gambarota, L., Martinez J., Sevestre P., and Worms, A., (2001), **Financial Systems and the Role of Banks in Monetary Transmission in the Euro Area**; *ECB Working Paper No. 105*. Frankfurt, European Central Bank.
- [17] FirstRand, (2009) **The role of banks in the South African economy**; Annexure 9.
- [18] Freixas, X, Rochet J S, (1997), **Microeconomics of Banking**; Cambridge, Mass: MIT Press.
- [19] Gambacorta L. and Mistrulli P.E (2003), **Bank Capital And Lending Behavior: Empirical Evidence For Italy**; Banca d’Italia, Research Department.
- [20] Gattin-Turkalj, K., Ljubaj, I., Martinis, A., and Mrkalj, M. (2007), **Estimating Credit Demand in Croatia**; Croatian National Bank Research and Statistics Area Research Department Zagreb, April 2007.
- [21] Gertler, M. and Gilchrist, S., (1994), **Monetary Policy, Business Cycles, and the Behaviour of Small Manufacturing Firms**, *Quarterly Journal of Economics*, May 1994, 1Q9 (2), pp. 309-40.
- [22] Ghosh, S. (2006), **Monetary policy and bank behaviour: Empirical evidence from India**. Published in: *Economic and Political Weekly* , Vol. 41, No. 10 (2006): pp. 853-856.
- [23] Goeller, G., & Szymanski, M. **Banking Survey 2005, Financial Services: Banking Environment in South Africa** by KPMG.
- [24] Gujarati, D (2011) **Econometrics by Example**, Palgrave Macmillan.
- [25] Han, C., and Phillips P.C.B (2010), **GMM Estimation for Dynamic Panels with Fixed Effects and Strong Instruments at Unity**; Cowles Foundation Paper No. 1290 *Econometric Theory*, **26**, 2010, 119–151. doi:10.1017/S026646660909063X.

- [26] Hayashi, F. (2000), **Econometrics**, Princeton University Press; New Jersey.
- [27] I-Net, **Negative growth in credit extension**, available: www.inet.co.za, Accessed on 2010/05/31.
- [28] Jimborean, R., (2008), **The Role of Banks in the Monetary Policy Transmission in the New EU Member States**. *Journal of Banking and Finance*, 1983, 7(3), pp. 383-404.
- [29] Juurikkala, T, Karas A, Solanko L, (2009), **The role of banks in monetary policy transmission: Empirical evidence from Russia**, BOFIT Discussion Papers 8.
- [30] Kashyap, A. and Stein, J. (1993), **Monetary policy and bank lending**; *NBER Working Paper, No 4317*.
- [31] Kashyap, A., and Stein J., (1995), **The Impact of Monetary Policy on Bank Balance Sheets**, in Carnegie Rochester Conference Series on Public Policy, pp. 151–195.
- [32] Kashyap, A., and Stein, (2000), **What Do One Million Observations Have to Say About the Transmission of Monetary Policy**, *American Economic Review*, Vol. 80, pp. 1183-1200.
- [33] Kashyap, A., and Stein, J., (1994), **Monetary Policy and the Bank Lending Channel**; in *Monetary: Studies in Business Cycle*. Vol. 29, pp. 221-256, *Policy*, Edited by N.G. Mankiw. Harvard, National Bureau of Economic Research.
- [34] Kishan, R. P., and Opiela, T. P., (2000), **Bank Size, Bank Capital, and the Bank Lending Channel**, *Journal of Money, Credit and Banking*, Vol. 32, No. 1 (Feb., 2000): Ohio State University Press.
- [35] Knoop, T A, (2008), **Modern Financial macroeconomics: panics, crashes, and crises**; Malden, MA: Blackwell.
- [36] Kohler, M, Hommel J, Grote M, (2005), **The role of banks in the Transmission of Monetary Policy in the Baltics**, Discussion Paper No. 06-005.
- [37] Mboweni, T. T., **New Monetary Policy Framework**, April 2000.
- [38] Mboweni, T. T., **The South African banking sector - an overview of the past 10 years**, Dec 2004.
- [39] Meltzer, C., (2007), **The Importance of Bank Loan Supply for real Economic Activity in the Euro Area- A panel Data Analysis**; University of Bonn.

- [40] Mishkin, F. (1996), **The Channels of Monetary Transmission: Lessons for Monetary Policy**, NBER Working Paper, No. 5464, February 1996.
- [41] Mishkin, S. (2007), **The Economics of Money, Banking and Financial Markets**; Pearson Inc
- [42] Nieman, G., and Nieuwenhuizen, C., (2009), **Entrepreneurship: A South African Perspective**, 3rd Impression, Van Schaik Publishers, Hatfield, Pretoria
- [43] Peek, J. and Rosengreen, E. S. (1995), **Bank Lending and the Transmission of Monetary Policy** *New England Economic Review*, Nov/Dec, 1995.
- [44] Pruteanu, A., (2004), **The Role of Banks in the Czech Monetary Policy Transmission Mechanism**; Working Paper series.
- [45] Pruteanu-Podpiera A.M (2007), **The role of banks in the Czech monetary policy transmission mechanism** *Economics of Transition, Volume 15(2) 2007, 393-428*.
- [46] SARB, (South African Reserve Bank), Supervision Department: **Annual Report 2000- 2010**.
- [47] Schmitz, B., (2003), **What Role Do Banks Play in the Monetary Transmission in EU Accession Countries**, Discussion paper, Centre for European Integration Studies (ZEI), Bonn, Germany.
- [48] Sichei, M. M., (2005), **Bank-Lending Channel in South Africa: Bank-Level Dynamic Panel Date Analysis**: *Department of Economics Working Paper Series*: Working Paper: 2005-10, November; University of Pretoria.
- [49] Smal, M. M., and de Jager S., (2001), **The monetary policy transmission mechanism in South Africa**; Occasional Paper No. 16: September; South African Reserve Bank.
- [50] South African Banking Analysis, Available Online: http://www.reportbuyer.com/banking_finance/banking/south_african_banking_sector_analysis.html
- [51] Stiglitz, J. E., and Greenwald B.C.N., (2003), **Towards a New Paradigm in Monetary Economics**, Cambridge University Press, Cambridge.
- [52] Stiglitz, J. E., and Weiss, A., (1981), **Credit Rationing in Markets with Imperfect Competition**: *American Economic Review*, 71 (3), pp. 393-410.
- [53] Vanhoose, D. (1983), **Monetary Policy under Alternative Bank Market Structures**.

APPENDICES

Table 1: The Structure of the Banking Sector in South Africa

| | 1994 | 1997 | 2000 | 2003 | 2006 | 2009 |
|---|----------------------------|------|------|------|------|------|
| Bank* | 39 | 41 | 41 | 22 | 19 | 18 |
| Mutual Banks | 2 | 4 | 3 | 2 | 2 | 2 |
| Branches of International Banks in RSA | - (figures unavailable) | 9 | 15 | 15 | 14 | 13 |
| Representative offices of foreign banks | 40 | 60 | 61 | 44 | 43 | 42 |
| Banks under curatorship | 1 | 1 | 0 | 1 | 0 | 0 |
| Banks In receivership | 0 | 0 | 0 | 2 | 0 | 0 |
| Banks in final liquidation | 1 | 1 | 1 | 1 | 2 | 2 |
| | | | | | | |

* Includes active banks and banks exempted by the Registrar of Banks (with effect from 1 July 1996) in terms of the Supervision of Financial Institutions Rationalisation Act, 1996 (Act No. 32 of 1996) and section 1(cc) of the Banks Act, 1990. Also includes Banks provisionally registered
Source: www.sarb.co.za

Table 2: Herfindahl-Hirschman Index figures of South African Banking Sector

| Year | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Actual H-Index | 0,136 | 0.131 | 0.175 | 0.170 | 0.182 | 0.184 | 0.184 | 0,190 | 0.189 | 0,189 |

Source: Statistics obtain from Bank Supervision Department of SARB- Annul Reports 2000-2009

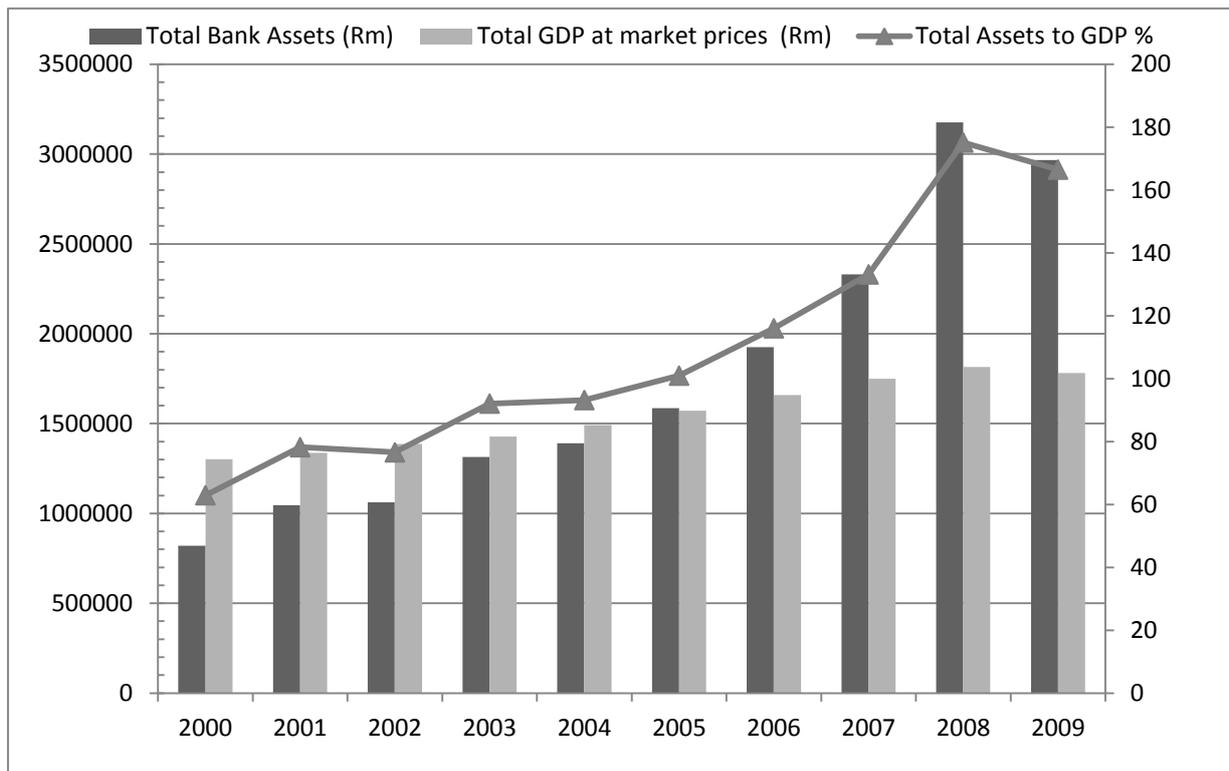
Table 3: Estimation Results

| Method: Panel Generalized Method of Moments | | | | | | |
|--|----------------|-----------|----------------|-----------|---|-----------|
| Dependant Variable: Bank Loans – Log(LS) | | | | | | |
| SAMPLE: | 2000Q1 2009Q4 | | | | (Adjusted):2000Q2 2009Q4 | |
| | STANDARD MODEL | | COMPLETE MODEL | | COMPLETE MODEL (Allowing cross section effects) | |
| Variable | Coef. | p. values | Coef. | p. values | Coef. | p. values |
| Log(GDP) | 1.840338 | 0.0000 | 0.621734 | 0.0711 | 5.204625 | 0.0000 |
| Log(RR) | -2.724911 | 0.0005 | -1.582506 | 0.3994 | -0.981545 | 0.4656 |
| Log(P) | 0.659662 | 0.0048 | 0.344502 | 0.0084 | -0.051852 | 0.5572 |
| Log(SZ) | | | 8.631469 | 0.0046 | 4.719524 | 0.0922 |
| Log(SZ)*Log(RR) | | | 0.080082 | 0.9512 | 1.145539 | 0.1582 |
| Observations | 320 | | 320 | | 312 | |
| Periods included: | 40 | | 40 | | 39 | |
| Cross-sections included | 8 | | 8 | | 8 | |
| Adjusted R-squared | 0.060915 | | 0.747038 | | | |
| d-statistic | 0.039278 | | 0.116716 | | | |
| Cross section effects | None | | None | | differences | |

Table 4: List of bank sample used

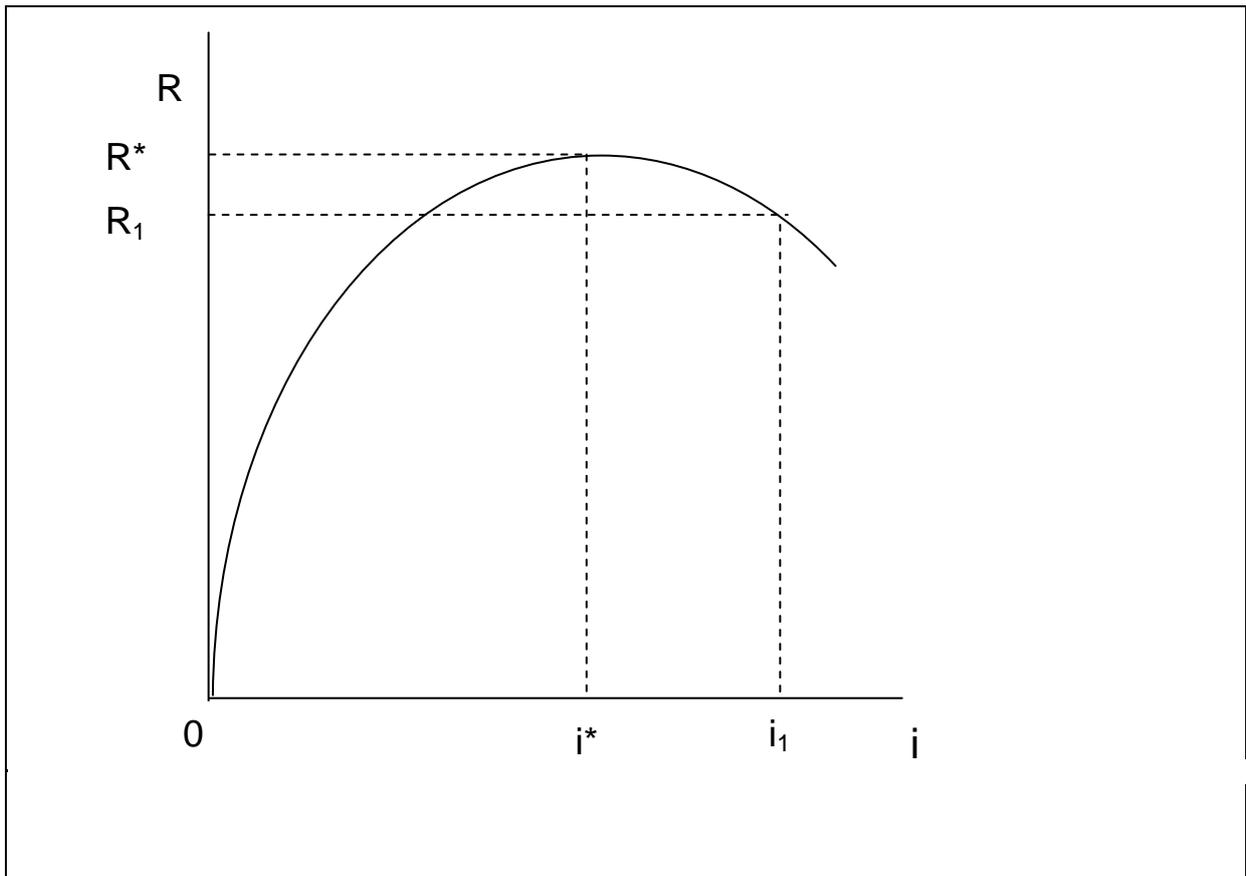
| Registered Name | | Notes: |
|-----------------|---------------------------------------|--|
| 1. | ABSA Bank Limited | 55.5% owned by Barclays PLC |
| 2. | African Bank Limited | - |
| 3. | FirstRand Bank Limited | Data for First National Bank only was used, not for the group. |
| 4. | Imperial Bank Limited | - |
| 5. | Investec Bank Limited | - |
| 6. | Nedbank Limited | Changed from Nedcor to Nedbank during the period |
| 7. | Sasfin Bank Limited | - |
| 8. | Standard Bank of South Africa Limited | - |

Figure 1: Total banking-sector assets to gross domestic product (GDP) in South Africa



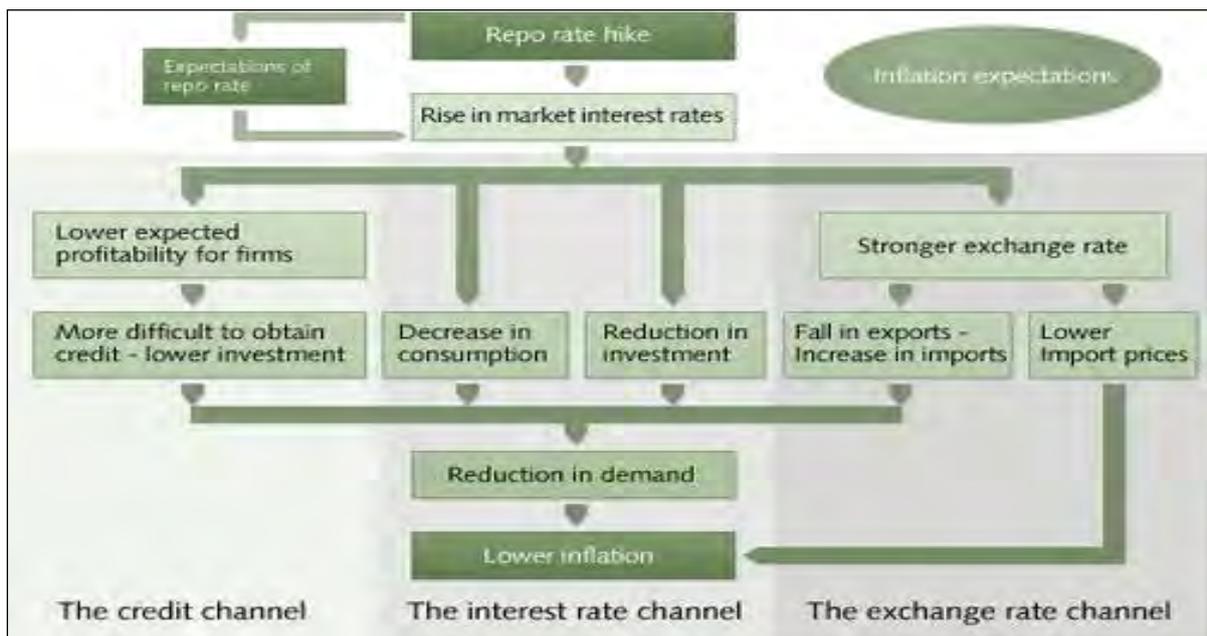
Source: Figures extracted from SARB Supervision Department Annual Report 2000- 2009

Figure 2: Trade-off between returns and interest rate faced by banks



Source: A sketch by authors

Figure 3: Schematic diagram of the monetary policy transmission mechanism



Source: Bank of England