



EVALUATING THE EFFECTIVENESS OF THE MACROPRUDENTIAL POLICY AND ITS INTERACTION WITH THE MONETARY POLICY IN ZIMBABWE (2009-2017)

Mr. Simbarashe MACHIRINANI

Department of Banking & Finance, Great Zimbabwe University, Masvingo, Zimbabwe

Mr. Twoboy SHOKO

Department of Banking & Finance, Great Zimbabwe University, Masvingo, Zimbabwe

Mr. Jonathan SHOKO

Department of Economics, Great Zimbabwe University, Masvingo, Zimbabwe

Mr. Stanfford Dumisile Gobodi DUBE

Department of Economics, Great Zimbabwe University, Masvingo, Zimbabwe

Mr. Thabani NYONI

Department of Economics, University of Zimbabwe, Harare, Zimbabwe

ABSTRACT

This study used the VAR models to analyze the financial stability of Zimbabwe for the period of 2009 to 2017. Data were taken from the World Bank's World Development Indicators, Zimstat and Reserve Bank of Zimbabwe (RBZ). This study employed co-integration test and vector error correction models (VECM) to examine both long-run and short-run dynamic relationships between the Macroprudential tools, monetary tools and the macroeconomic variables. The time series properties of the data were, first, analysed using the Augmented Dickey-Fuller (ADF) test. The empirical results derived indicate that all the variables were stationary after their first differencing; that is variables are integrated of order one, I(1). The study further established that there is co-integration between GDP growth, inflation, MFCI, leverage ratio and M2 growth rate in Zimbabwe indicating long run relationship. The VECM model was appropriately identified using AIC information criteria with co-integration relation of exactly one. The identified long term relationship indicates that inflation rates have a negative effect on financial stability (MFCI) while they showed a positive effect on GDP growth. M2 growth exhibited a positive impact on inflation and leverage ratio has a negative effect on financial stability. The study further investigated the causal relationship using the Granger Causality analysis, which indicates a uni-directional causal relationship between GDP and financial stability and bi-directional causal relationship between GDP and inflation rate at 5%. The government of Zimbabwe should develop a framework for Contingency Planning and Systemic Crisis Management which outlines a set of monetary and macroprudential policy actions and processes necessary for the prevention, management and containment of banking systemic distress and crisis. This will help safeguard both price and financial stability. This study investigates how the macroprudential policy could interact with the Reserve Bank of Zimbabwe's monetary policy function. Whilst these policies pursue different objectives of financial and price stability respectively there is likelihood for spillover effects between them. The preliminary deductions about how they should be set in combination with each other are deliberated; the research provides a conjunction of both theoretical and empirical analysis of the effectiveness of the macroprudential policy in Zimbabwe. Finally there is an existence of complementarities and potential conflict between monetary and macroprudential policy.



1.0 INTRODUCTION

The economy of Zimbabwe has experienced economic challenges for almost a decade (1998-2008), which calmed in February 2009 following the adoption of multi-currencies which the United States dollar and South African rand were dominant. The whole economy was severely affected by this national economic catastrophe and consequently resulted to liquidity and credit problems which chronically affected the financial institutions, companies and general populace countrywide. The onset of February 2009 onwards marked a new era in all the economic sectors including the financial sector. Regardless of fresh expectations for optimal profitability and price stability generated by implementation of a multicurrency framework the basic roles of the financial sector, even so did not change. Optimism grew that the multicurrency era will bring in financial stability in the economy and hence the financial sector. Conversely, as from 2011, the problems that faced the financial sector include macroeconomic illiquidity, low savings, volatile deposits and short term loans coupled with the absence of an active inter-bank market and limited access to affordable external credit lines (RBZ, 2013). Though, recognizing that intermediation attracts costs the rates of interest which the banks charge in relative to deposit rates has been an outcry, the interest rate spread has continued to be high and is failing to consistent to the expected stability. The Reserve Bank of Zimbabwe (RBZ) has responded in fixing the maximum lending rates to 18% (2016 Monetary Policy).

Many countries have raised financial stability concern over the past few years to such a level that is sufficient to warrant a policy response. In many cases the monetary policy regime has not been altered instead the Macroprudential tools were deployed to rectify the economic and financial anomalies. The Monetary policy has fundamentally remained dedicated on inflation and employment leaving the issue of financial instability to be dealt with by regulators and their macroprudential approaches. However the separation principle needs to remain principally intact. As a matter of fact the macroprudential tools deployment may be professed as a further removal of the monetary policy need to be concerned with the stability of the financial system. For instance the countercyclical capital policy can be employed as a reduction measure for the banking sector's leverage and expansion of its loss absorbing capacity during expansion. Adjusting the suitable timing and the degree for using this tool conversely poses certain practical challenges similar to those associated with the monetary policy. There exist distinctive objectives and processes for both macroprudential and monetary policies. Conversely there can be significant and substantial interactions between these two policy regimes. Firstly in pursuing financial stability macroprudential policy can have

implications for monetary policy and similarly monetary policy can have implications too on the macroprudential policy's achievement of financial stability. The existence of these potentially interactions means different outcomes, it can be useful in some circumstances and conditions to coordinate both policy decisions while retaining and maintaining each policy focus on its policy objective.

1.1 Relevance of the Study

Since 2011 the problems that faced the Zimbabwean financial sector include macroeconomic illiquidity, low savings, volatile deposits and short term loans combined with the lack of an active interbank market and narrow access to affordable credit lines (RBZ, 2013). The Monetary policy own its own has failed to achieve financial stability regardless of maintaining price stability, this is because financial instability causes are not always associated to the rate of interest level or the system degree of liquidity which can be affected by the Monetary policy. In the same way the Macroprudential policy use mainly for managing aggregate demand may create additional distortions through the impositions of constraints on behaviour beyond where financial distortions originate. The availability of both policies is therefore desirable whereby the monetary policy primarily focuses on price stability and Macroprudential policy on financial stability. This study reviews the newly emerging paradigm of macroprudential intervention, its effectiveness and how it interacts with the monetary policy. The study also introduces the side effects that one policy can have on the objectives of the other. It shows how interactions can improve or adversely affect the effectiveness of each policy in achieving its objectives. Finally it suggests some necessity for coordination and clear institutional designs.

2.0 LITERATURE REVIEW

2.1 Interaction monetary and macroprudential policy

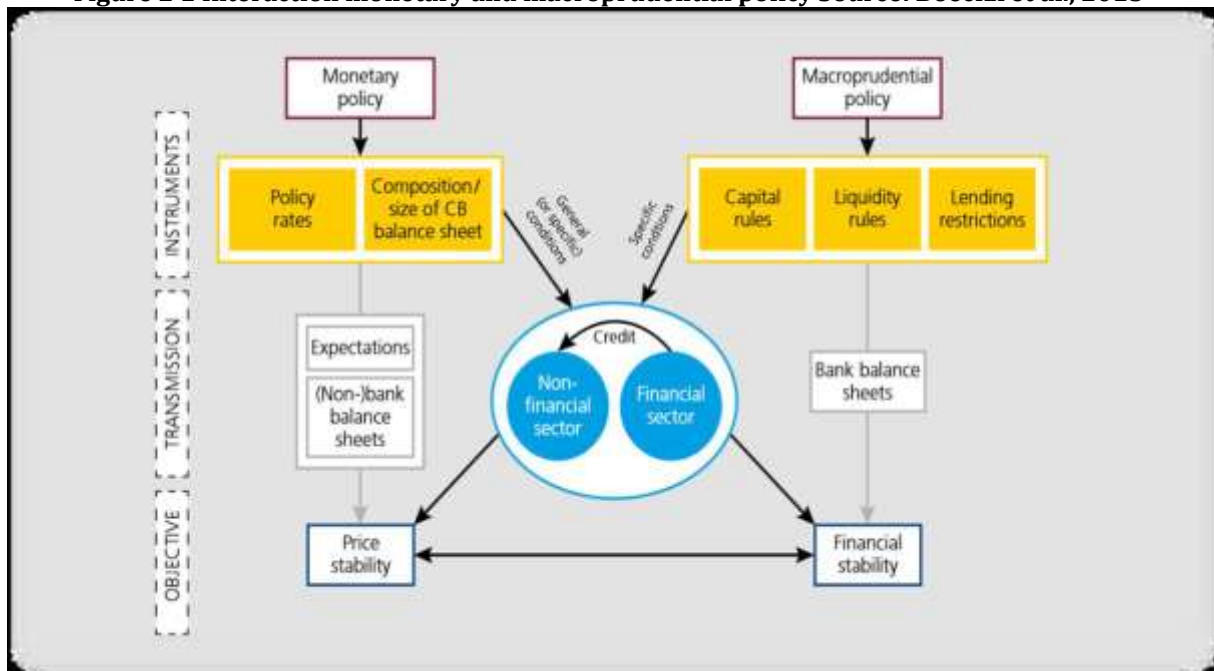
Anna Schwartz wrote one of the most significant articles pertaining to the relationship between the monetary policy and the macroprudential policy. In the article entitled "Why financial stability depends on price stability" she came up with a following comprehensive hypothesis: "a monetary and price stability regime is the route to financial stability" (Schwartz, 1995, p .25). A description by Borio and Lowe (2002) provided a following presumed mechanism: "a monetary policy regime that yields aggregate price stability will as a consequence tend to promote the stability of the financial system" (Borio and Lowe, 2002, p. 27). The fundamental argument is that price instability on the other hand will result in inflation distortions and in so doing mounting uncertainty and shorter investment horizon. Alternatively price instability

would arouse speculative investments and may possibly adversely affect the value of collateral (Blot et al., 2015). These mutual effects would result in financial instability.

Conversely the 2007-2009 global financial disaster has raised doubts on the hypothesis proposed by Schwartz (1995). Comparatively the stable and low inflation rates experienced during the years before the crisis failed to prevent the crisis from happening. As evidenced in literature the positive correlation that exists between price stability and financial stability has been queried already before the crisis. As contended by Borio and Lowe (2002) that

the inflation rate that is low and stable may possibly lead to financial instability as an expansionary monetary policy makes high risk projects more attractive and appealing. Gambacorta also discovered that the exploration of low interest rates can lead to an increase in risk taking (Gambacorta, 2009). However it is not always the case that only price stability and financial stability influence each other, correspondingly monetary and macroprudential policy instruments can also interact. Boeckx et al. (2015) envisioned the interaction between macroprudential and monetary policy fields as illustrated in the following figure.

Figure 2 1 Interaction monetary and macroprudential policy Source: Boeckx et al., 2015



The macroprudential and monetary policy regimes employ a broad range of instruments depending on their objectives and also take into consideration the Tinbergen rule. Monetary policy is fundamentally established on the strong positive association between long term money and inflation. It normally embraces a single monetary policy instrument to maintain the price stability that is key interest rates. The instruments for the macroprudential policy are targeted and directed at the financial system as a whole which distinguishes them from individual institutions policy instrument (Committee on International Economic Policy and Reform, 2011).

These instruments can further be broken down into triple distinct categories. The first category the capital category and comprises of the countercyclical capital buffers, systemic risk buffers, leverage ratios as well as sectoral capital requirements (Boeckx et

al., 2015). Liquidity rules are represented by the second category this consists of the liquidity coverage ratio which is a short term ratio requiring the financial institutions to maintain high quality of liquid assets in order to fulfil short-term obligations which emanates as a result of unexpected liquidity disruptions.

Banks are encouraged to hold a given quantity of highly liquid assets equivalent to their net cash outflows in excess of a stress period of thirty days (Bonner & Eijffinger, 2013, p.2). In crisis periods this liquidity rule might force the banks to reduce their rates of lending volumes. The final category represents the lending limits which include loan to value caps, service to income caps and loan to income caps (Boeckx et al., 2015). As a way of systemic risk reduction these policy tools are used and they can directly affect the financial institutions



balance sheet and build resilience against adverse economic shocks.

Even though the macroprudential and monetary policies have their own objectives and instruments, there is a need to recognise that these policies closely interact with each other. Despite the fact that the macroprudential main objective is financial stability and monetary policy's main objective is price stability. Both policies interact in their transmission and as a result they affect each other's objective. For instance the macroprudential tools aimed at controlling money lending can become counter to measures of the monetary policy. Whereas the monetary policy might aim to raise borrowing and expenditure in the economy by using expansionary monetary approach such as quantitative or credit easing, the macroprudential policy might aim at enhancing the banks loan to value ratio and as a result reduce the amount the banks will supply. So as to have a better understanding on how these policy instruments interact in their transmission as their effects spread concurrently across the financial system, their transmission channels will be outlined and explain the manner in which they affect the economy.

Mishkin (1996) gives a synopsis of the monetary transmission channels beginning with the traditional rate of interest channel extending to channels functioning through other asset prices plus the credit channels. For over a period of fifty years the interest rate channel has been regarded as a standard feature in literature. Its assumption is that the decision of a monetary policy such as monetary relaxing can result to a decline in the real interest rate which as a result lowers cost of capital leading to an increase in investment expenditure.

The monetary policy also functions through the credit channels that are the lending channels of banks plus the balance sheet channel. These two channels are based on the idea that banks play a pivotal role in the financial system for the reason that there are well suited to resolve problems of information asymmetry between investors and borrowers in credit markets. Banks exercises this by a method of monitoring borrowers and safeguarding a suitable use of depositors' funds, that is through the suppression of adverse selection and moral hazard.

The banking lending channel has an assumption that the decision of the monetary policy for instance the monetary relaxation will result in the growth of bank reserves and deposits. This will in turn the base of bank loans available also resulting in investment expenditure. Alternatively the balance sheet channel assumes a decision of the monetary policy such as monetary relaxing may result to an increase in equity prices which as a result raises the firms' net worthy (that is by positively enhancing a firm's balance sheet), causing a higher investment expenditure for the reason that the decline in adverse selection and moral hazard associated problems.

Since an expansionary monetary policy leads to low nominal interest rates, this can lead to high investment expenditure because of the reduction in moral hazard and adverse selection problems. The other channel which is the asset price channel is also part of a monetary transmission channel through which the asset prices may be affected by monetary policy decisions. As a result these asset price effects will successively affects the economy.

Asset prices comprises of three categories which are regarded as critical through which the economy is affected by the monetary policy. These are real estate prices, exchange rates and stock market prices. There is a link that exists between risk taking and the monetary policy which is known as the risk taking channel. Gambacorta (2009) examined the link that exists between the bank risk taking and low interest rates. He came to the conclusion that a long period of expansionary monetary policy will stimulate the financial institutions and banks to take excess risk as a result affecting the level of activity. Through this channel the expansionary monetary policy does not only lead to a rise in lending as described above in the framework of monetary policy transmission channel. But can however lead to a rise in the overall lending riskiness in turn fuelling the probability of a financial crisis.

Comparably the monetary transmission mechanism described above, macroprudential tools directly affects the balance sheet of financial institutions and in this manner rendering these institutions less vulnerable to adverse shocks, stresses and the reduction of financial systemic risk. The macroprudential transmission measures follow adjustments measures made by the financial institutions in their behaviour responding to the restrictions of balance sheet imposed on them

2.2 Are Macroprudential and monetary policies mutually beneficial of reinforcing?

The objectives of macroprudential and monetary policies are mutually beneficial and reinforcing that is they may possibly benefit from the policy decisions of each other (Lautenschlager, 2014). For instance financial stability which is an objective of the macroprudential policy may benefit a monetary policy decision to implement tools as a feedback to the build-up of financial inequalities that jeopardize price stability in the medium term, that is increasing monetary policy's interest rate may possibly slow down leverage build up and financial imbalances. However macroprudential tools might also been an essential complement to the monetary policy for instance in the period before financial crisis.

Conversely, macroprudential tools may also have been a useful complement to monetary policy for example in the years before the financial crisis in 2008. If the financial institutions had got into the



economic depression with many stable funding sources and bigger capital buffers, the necessity for monetary policy easing would be reduced, that is the deployment of macroprudential regulations during economic recessions can reduce the probability of running up against the zero lower bound on interest rates.

Despite the fact that macroprudential and monetary policy regimes may play complementary roles in attaining price and financial stability, these policies can also be independent or contradictory (Beau et al., 2002). The result will be determined by the imbalances of demand and supply across the real economy and the financial system. Both policies decisions will not affect each other if one or all of these policies' cycles are in a neutral position. The highest degree of complementarity will normally occur if the real and financial cycles are in sync that is either they are rising or dropping together.

However both policy regimes will have a greatest probability of conflict if the real and financial cycles are out of sync. A common case of a contradictory impact will be a situation which there is an identification of an asset or credit price bubble whilst there is high risk that the inflation will end up lower than the target. This is case if there is a misalignment of demand and supply forces in the real economic sector and the financial system but moving in opposite liquidity directions. In such a situation the macroprudential policy would enact measures so as to restrict credit and growth however this may possibly lead to an unanticipated contraction in aggregate activity and to an increased downside risk to the price stability. These actions undertaken by the macroprudential authority would assure that the objective of the financial stability is attained but would pose a negative impact on the objective of the monetary policy which price stability.

Subsequently this would demand for the relaxation of the monetary policy condition as a result having an effect on the objective of the monetary policy. An expansionary monetary policy will contribute to the development of financial imbalances through the risk taking channel (Rajan, 2006; Borio & Zhu, 2008). The expansionary policy leads to a decline in interest rates and this may as a result incentivize banks to take more risk through the exchange of several channels comprising asset substitution, procyclical leverage, risk shifting and search for yield (De Nicol, Dell'Arrica, Laeven, & Valencia 2010) this is when the banks are operating under limited liability and information asymmetry.

Generally the maintenance of financial stability can assist safeguard an ideal working financial system as well as a transmission process that is effective, which as a result will make the achievement of price stability more efficient. However there is a need to consider the condition of the real economy as well as the financial system in order to avoid contradicting conditions. Generally the

separate-assignment principle propounded by mundell for designing macroprudential and monetary policies should then not be taken as a mandatory condition. It should guide us to the supposition that the macroprudential policy need to consider the monetary policy and vice versa (Yellen 2010).

2.3 Microprudential policy reinforced by a macroprudential framework

One great lesson that was learnt after the financial recession in 2008 was that the microprudential policy design was not adequate to safeguard the financial system stability. Lopez et al. (2015) specified that the development of overconfidence in financial institutions and regulators in their capability to micromanage risks at an individual of firm level without a broader picture of the financial system resulted in the occurrence of the crisis. The financial institutions were very confident that they had eliminated the probability of most risks through hedging their idiosyncratic risk through the use of financial products like credit default swaps. The regulators and monetary authorities monitored the individual financial institutions so as to ensure that no single financial entity or single bank was taking oversize risk. Even though the regulators of financial institutions believed that they were doing appropriate management, they failed to anticipate that the overemployment of the securitised financial products such as credit swaps formed harder to assess risk exposure amongst banks as well as that these minor destabilising forces may well endanger the whole financial system.

It is imperative to note that microprudential policies like banking supervision and regulation are still a necessity in guaranteeing the wellbeing of individual institutions. However from the outcome of the financial crisis it is evident that they are not enough when it comes to safeguarding the wellbeing of the financial system as a whole. It also became apparent that warranting the solvency of individual institutions does not avoid a systemic crash as they were mitigating idiosyncratic risk at the same time forgetting to monitor systemic risk.

The emerging of the financial crisis clarified the need for macroprudential supervision that embraces a broad view of the financial system which is complementary to microprudential regulation. The macroprudential approach is designed for entire industries and the wellbeing of the associations within the financial sector which can influence the economy at large. Its key goal is the monitoring of systemic risk which can be noticeable in two dimensions (Bijlsma, 2010). That is across institutions known as contagion risk and across the financial cycle actually known as procyclical risk. As a remedy to mitigate these risks the macroprudential policy works in two main ways. Firstly it assists to curb incentives for excess ex-ante risk taking through the awareness of individual



institutions in terms of how their actions affect the financial stability and the economy. Secondly it attempts to build up the resilience of the financial system thereby lessening its vulnerability during events of economic shocks.

2.4 Should the Monetary and macroprudential policies integrated or separated?

Should the design of monetary and macroprudential policies be placed under one roof or is there a need for policies separation so as to preserve price and financial stability? Up to now there is still no consensus concerning the degree of alignment between these two policies in order to achieve their main objectives of price and financial stability.

2.4.1 The Separated perspective

The separated perception is of the idea that the monetary policy has to remain focused towards price stability whilst the macroprudential policy must be directed towards financial stability with each individual policy consisting of its own instruments to attain its objective. This perception is normally described as a modification that was prevailing before the onset of the crisis. The principal differences in comparison with the consensus stand in the formation of a credible and effective macroprudential policy to mitigate systemic risk and sustain financial stability. In the event of the macroprudential framework in place, the monetary policy can then as previously concentrates exclusively on price stability objective (Svensson 2013). Conversely the monetary policy should consider the variations on its transmission mechanism emanating from the usage of the macroprudential toolkit by the authority responsible for the macroprudential policy and should as a result still have financial stability monitoring role and the exchange of information with macroprudential authorities Adrian, Covitz & Liang, 2013).

The separated perspective proposes that the monetary policy does not significantly contribute to financial imbalances development. This concludes that the risk taking channel is regarded as insignificant. Furthermore if at any given point in time the monetary policy was to focus on both price and financial stability this will result in a serious conflict objectives and the challenge of time inconsistency may arise. This can lead to the development of situations where ex-ante, monetary policy will decide on the optimum inflation and ex-post the reserve bank would choose a rate of inflation much higher and above social optimal inflation level so as to reduce the private debt real value (Ueda & Valencia, 2014). Finally this perception is established on the judgement that in comparison to macroprudential policy, the short term rate of interest is not an instrument that is very effective to rectify those existing imbalances.

The most recent proposed model by Collard et al. (2017) backs the separated perspective. The study is about the optimum assignment of the macroprudential and monetary policy regimes in a model which has financial and price rigidities (in a Ramsey sense that is maximisation of social welfare). The financially instability source originates from the socially excessive risk taking by the banking sector due to deposit insurance and limited liability. The model is made interesting in that it provides a linkage between excessive risk taking and type of projects that the bank institutions may be tempted to fund but not necessarily the volume. This model suggests that maintaining an adequate amount of capital requirements may enforce banks to tame their risk taking behaviour. Comparably the monetary policy is assumed to be less suitable for this task because it mainly affects the volume relatively to the composition of credit and as a result this has no first order consequences on risk taking incentives. Therefore this proposed framework does not propose a robust connection between the interest rate policy and the financial stability.

The model propounds that during the emergence of shocks that does not affect the banks risk taking incentives, the macroprudential policy must leave the required capital constant and the monetary policy must drive the rate of interest in a standard direction to stabilize prices. In the event of shocks that decrease or increase banks' risk taking incentives the prudential policy should as a result cut or raise capital requirement and the monetary policy should as well raise or cut the rate of interest in order to reduce the consequences of prudential policy on bank lending and output. In the latter instance the optimum prudential policy is procyclical in nature (as it is the direct cause of the contraction). Whilst the optimum monetary policy is countercyclical in nature this means that in this case both policies move in the divergent directions over the cycle. This is however a view that has been visualized by various policymakers and financial analysts for instance Macklem (2011) and Yellen (2010).

2.4.2 The Integrated perspective

The integrated framework suggests a more radical transformation in the monetary policy objectives. This framework maintains that the objectives of the macroprudential and monetary policies are extremely intertwined and that the tools and transmission mechanisms for these policies are likewise exceedingly interacting, therefore it concludes that it is both ineffective as it is impossible to separate the objectives. For instance the security purchase programmes, the nonstandard monetary policy measures implemented by the European Central Bank does not contain direct intended impacts of monetary policy (control of interest rates) but it does have an effect on the financial stability through the stealth recapitalisation of struggling financial intermediaries, this mechanism indirectly



feeds back into price stability (Brunnermeier & Sannikov, 2014).

In a related way the macroprudential measures which are employed to affect lending poses an impact on money creation and openly feeds into price stability (Brunnermeier and Sannikov, 2014b). These illustrations demonstrate the conditions of financial markets should therefore be always included in monetary decision making processes. Therefore the integrated framework advocates for the use of macroprudential and monetary policy instruments simultaneously so as to safeguard financial stability and price stability at the same time. According to Leeper & Nason, (2014) it is not essential to classify monetary and macroprudential instruments by target area because it is counterproductive. However these two policies require for close cooperation and therefore the monetary policy must always consider financial markets events.

A bottleneck approach must be employed if the economy plunges into a recession or a downturn through the joint efforts of both policies. That is the financial sectors that are mostly affected from a debt overhang and those whose statements of financial positions are hardly hit must be primarily supported. In the event of the absence of such policy efforts the shrinkage in some sectors can simply cause an expansive liquidity spiral. The central banks need to take into consideration the interactions between here concepts that are price, financial and fiscal stability. The aggregate, the sector specific credit growth as well as other monetary aggregates should be closely monitored. Relying simply on the rates of interest is misleading. Quantity aggregates should be closely monitored and acted upon because when there is a build-up of imbalances the economy becomes vulnerable. The worst case scenario is the development of the danger of financial dominance in which the central bank is cornered by the financial industry to conduct certain policies that will deprive their liberty to fight inflation.

2.5 The risk of Financial Dominance

The challenge of financial dominance refers to the risk that the consideration of financial stability undermines the central bank's credibility on the price stability mandate. A simple illustration to explain the risk of financial dominance is when a monetary policy in the case of a severe financial crisis outbreak gears its monetary toolkit to calm down the financial sector at the expense of its price stability objective. The reason will be that the central bank is playing a role in financial stability and as a result needs stronger participation in distributional policies as well as in quasi fiscal operations. This ultimately runs the risk abandoning the central bank's mandate of price stability. At times the risk of financial dominance contains a form of hidden fiscal dominance (Hellwig, 2014). This normally occurs when financially weak banks are being overstretched

into funding their respective governments when the concerns of financial stability are inducing the central bank to offer them abundant and cheap funding. For the protection of central banks from the financial dominance risk robust arrangements are needed for the prevention of crisis, high equity requirements as well as macroprudential arrangements that mitigates and makes the crisis unlikely. There is also a need to avoid a system in which the central bank makes macroeconomic needs subordinates private institutions whilst assuring to support them if risks turn out badly. Such a framework will make moral hazard worse as the private institutions are mostly assured of support in case of risk turnout plus that is incentivising risk taking.

2.6 The Zimbabwean Institutional framework of the monetary and macroprudential policy

2.6.1 The Monetary policy institutional framework

Since independence the monetary policy regime has revolved and several shifts have been noticed. During the 1980s the monetary policy framework was controlled and as a result it was rendered inactive (Kanyenze, et al .2011). The economic environment and conditions were normally characterised by extensive controls the controls were targeted on prices, wages, credit, interest rates plus foreign exchange allocations (Ojo, 1997). The monetary policy was largely composed of direct instruments such as controls on deposits and lending rates, the usage of Reserve bank bills, the quantitative controls on credit, moral suasion and prescribed assets amongst others (Makina, 2009). The rate of inflation averaged 12 percent whilst the rate of interest averaged 9 percent. In this case the real rate of interest was negative leading to the discouragement of savings mobilisation. Moreover the Zimbabwean economy experienced high budgets deficits which were funded by the banking sector this further decreased the monetary policy effectiveness.

Towards the last years of 1980s the government of Zimbabwe appealed for financial assistance from the Bretton woods institution. A strict prescription of the structural adjustment reforms was recommended. This caused a complete policy transformation by the introduction of liberal programmes which were initiated through the Economic Structural Adjustment Programme. The prescription comprised of the interest rate controls removal. This means that the policy framework was now transformed to open market operations and a flexible interest rate framework which became the key tools through which the monetary policy regime was being executed (Ojo, 1997). The Reserve Bank of Zimbabwe employed a monetary targeting strategy which was focusing on the money supply measures that is M1 and M2 (Makina, 2009).

The central bank concentrated on controlling the amount of credit that was available for the



government and the banking system so that it commensurate with the anticipated level of net domestic assets. Conversely this method failed to work because the prevailing budget deficit was funded by heavy borrowing from the banking sector which stimulated the rate of inflation. After failure to curtail the rate of inflation through targeting money the Reserve Bank transformed and shifted to reserve money targeting. The focus of the monetary policy concentrated at fixing the level of the reserve money through the desired level of M3. This strategy also failed to produce desired results as inflation persisted to escalate surpassing 50% by 1999 (Zimstat, 2012). This challenge was also worsened by the fact that the government failed to stick to the reserve money targets because it suffered enormous budget deficits between 1998 and 1999 which was funded by the Reserve bank (IMF, 2001).

Following the Zimbabwean financial crisis of 2008 hyperinflation which is believed to be the second highest in recorded history, the Government in 2009 declared the multiple currency regimes as one of the main policy framework that halted hyperinflation (MOFED, 2009b). The Reserve bank is however failing to regulate the money supply and the country has suffered from liquidity challenges (RBZ, 2012). This is an outcome of accumulative current account deficits (MOFED, 2011). This means that as long as the economy continues to experience current account deficits liquidity conditions will continue to deteriorate. The situation has been also exacerbated by closing down of companies and the informal sector at large which is unbanked. The regulation and supervision of financial sector is therefore essential for the Reserve bank to warrant that the public is not excluded from the formal monetary system.

Besides the fact that the central bank has lost control over money supply it is also incapable to play its role of the banker to government which is currently being played by commercial banks mainly the Commercial bank of Zimbabwe (CBZ). It has been observed by the government that the Reserve bank's undercapitalisation may possibly compromise its efficacy in its execution of the banker to government role. During the national budget presentation in 2014 the Treasury announced that the Central bank will recommence the role of the banker to government after the capitalisation of the bank (MOFED, 2013).

Another essential function is the lender of last resort it is critical for the prevention of financial panics and bank runs which may probably have many spillover impacts to the whole economy (Diamond and Dybvig 1983; Allen and Gale, 2000; and Freixas, et. al, 2000). As long as the rate of interest is higher as compared to other financing sources the lender of last resort remains critical as a contingent position for banks. The government intensified its effort for sourcing money to safeguard that the Reserve bank

undertakes this role but to no avail. Moreover the intermarket is dysfunctional. Typically as a prerequisite banks need to hold sufficient amount of liquid assets like cash as a provision for any potential over runs by depositors. In case the bank is incapable to match these liquidity requirements, there will be a need for it to borrow from the interbank market. Therefore those banks holding additional liquidity will lend on interbank market and receive interest. Usually banks do borrow and lend on the intermarket so as to manage the liquidity and to satisfy reserve requirement regulations.

2.6.2 The Zimbabwean Macroprudential policy institutional framework

The Reserve Bank of Zimbabwe is the responsible monetary authority for prudential regulation and watches over the financial stability of the financial system (systemic risk). The Central bank is mandated to superintend systemic risks that may arise from key financial institutions. The Bank comprises of an entity under it that is supervised by the deputy governor and the entity is accountable to the Reserve bank of Zimbabwe. However, currently the country uses a Silo-based approach which instigates a blinkered strategy to regulation and supervision. The strategy involves multiple regulators or supervisors contingent to the institution.

The central bank has tried to moderate this through entering into a memorandum of understanding with selected regulators and through the introduction of consolidated supervision. Conversely all these are efforts to overcome silo approach weaknesses but they are still not adequate for optimum regulatory and supervisory structure. The government has introduced systemic liability committee in an effort to implement macroprudential approach. This strategy has been found to be efficient and effective if it is complemented by the specialization in the prudential regulation, market conduction (financial conduct) as well as the supervisory structure.

The 2007-2009 global financial catastrophes has transformed to a macroprudential approach of regulation which consists of an analysis of macroeconomic trends and their impact on the prudential soundness, stability of financial firms and the financial system. This strategy seeks to identify and regulate risks that exist between the financial institutions. The motivation and the rationale behind this approach is centered on the fact that if one financial institution has large exposures, the spillover effects will adversely affect the other.

Alternatively strategies designed to enhance the soundness of one entity might have unanticipated negative effects on the other. When the regulator overlooked the tricks of the banking sector of recapitalizing through levying exorbitant bank charges, the unintended effect was the loss of confidence by the general public in the banking system. The same weakness also led to the

extortionate lending rates in 2009 which caused unanticipated negative effects of degrading the viability of industry and commerce. The government of Zimbabwe has adopted the Common Market for East and Southern Africa (COMESA) approach.

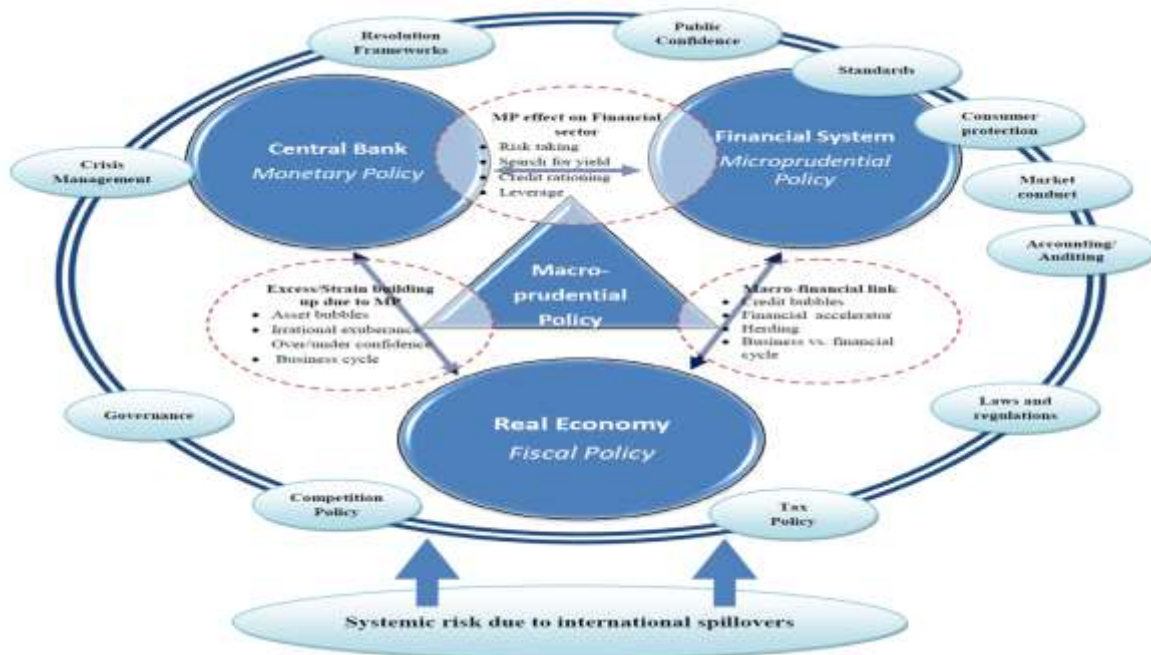
2.6.3 The COMESA Macroprudential Approach

According to COMESA region, there is an immediate need for all member countries that does

not currently have a macroprudential framework in place to do so as soon as possible.

Moreover, every member state should work together to harmonise and complement the macroprudential frameworks through the region in their bid to pursue the integration ambitions. The figure 2.2 below shows the COMESA financial stability institutional framework.

Figure 2 2 Institutional Framework for financial stability



Source: Van de Merwe, I., 'Macroprudential policy: A conceptual framework' Department of Economics, University of the Free State

There were three traditional fundamental areas namely the monetary policy, microprudential area and the fiscal policy. By concentrating on the entirety of the financial system macroprudential policy can develop the supervisory and regulatory authorities' grasp of the network of connections between the macro economy, financial markets and the financial system.

2.7 Related Empirical Studies

The existing empirical literature provided by various authors and researchers in different countries in association with the area under study is analysed below. However the academic literature concerning the discussion on the optimal institutional setup for the conduct of the macroprudential policy is still limited. Various sources of literature have found the benefits of both policies complementary nature whilst others illuminate the potential trade-offs as well as potential conflict of interest. The Recent evidence concerning the effectiveness of macroprudential policy is mixed and still preliminary. The empirical

literature review will further supplement and provide guidance on the appropriate methodology for this research.

De Paoli and Pustian (2013) provided an analysis through which the monetary and macroprudential policy should be conducted so as to effectively regulate macroeconomic fluctuations. In a new Keynesian model containing normal rigidities as well as credit constraints which also contain credit frictions they clarified on the effects of an introduction of macroprudential policies and the issues concerning the potential coordination. They concluded and confirmed that the development of a macroprudential instrument aiming the credit market distortions could substantially cause the improvement of welfare after a cost shock. Moreover they discovered that selecting a macroprudential instrument which is alike or too similar to that of the monetary policy can originate costly coordination problems among the monetary authorities or policy makers.



In another study conducted by Gelain and Ilbas (2014) on US data, they addressed the question the question on how these two policies should interact to safeguard financial stability. Their focus was on the best degree of coordination amongst the monetary and macroprudential policymakers. Their conclusion was that there are substantial gains that arise from coordination if the macroprudential authority is assigned a sufficiently significant interest in the output gap harmonized with the monetary policy authority objective. In the event that the macroprudential authority is primarily or solely focusing on credit growth improved and better outcomes can be accomplished in the nonexistence of coordination, even though in this setup the Central bank performs poorer. As a result they concluded that the macroprudential policy addition to the monetary policy is contingent on the relative weight allocated to output fluctuation in the obligation of the macroprudential authority. Angelini et al. (2014) used a dynamic general equilibrium model with a banking sector to analyse how the monetary policy and capital requirements interact. They only discovered the modest benefits of capital requirements in normal periods relative to a scenario where only the monetary policy is employed to stabilise prices. They identified a need to cooperate between both authorities to attain these gains. Conversely in the event of financial shocks affecting credit supply, the capital requirements policy instruments benefits yields an essential asset for the macroeconomic stabilisation particularly in a case where both authorities cooperate.

Quint and RabanaI (2014) designed an estimated two country model targeting the Euro area, the model use real, nominal and financial friction on which the monetary and macroprudential policy have an impact. They discovered that the macroprudential policy framework improves the general welfare through assisting in the reduction of macroeconomic instability. Likewise their conclusion was that the macroprudential is complementary to the monetary policy since it assists in the reduction of the accelerator effects and therefore a less strong reaction of the rate of interest as a reaction to financial instability. Conversely in certain conditions introducing macroprudential policy can have losers and winners. Particularly if macroprudential framework regulations respond to credit to GDP ratios such policy can adversely borrowers' welfare whereas increasing the general welfare. Lim et al. (2011) presented the IMF survey data. Using this database Lim et al. (2011) discovered that many various macroprudential instruments reduce the procyclicality of credit growth through the reduction of the correlation that exist between growth and GDP growth. IMF (2012) explored the association between macroprudential and monetary policy using the similar IMF survey. Their focus was on capital requirements, reserve requirements and loan to value

(LTV) and debt to income (DTI) caps. That research discovered that capital requirements and reserve requirements limits credit growth but that the impacts are different in credit bursts as opposed to credit booms for capital requirements.

They also used a panel regression analysis using data from 49 countries during a ten year period from 2000 to 2010 collected in the IMF survey, to find the relationship. They concluded that macroprudential instruments can have an impact on four measures of systemic risk which are credit growth, systemic liquidity, leverage, and capital flows. Precisely eight instruments were estimated to understand if they can limit the procyclicality of credit and leverage as well as their effect or tendency to amplify the business cycle. Procyclicality is observed in this instance through the respective correlation of growth in credit and leverage with the growth in GDP. They observed that the specification has a merit of highlighting the tools in both expansionary and contractionary phases of the cycle without timing the cycle. Zhang and Zoli (2014) reviewed the use of main macroprudential tools and capital flow methods in 13 Asian economies and 33 other additional economies since 2000 studying their effects. Their analysis proposed that measures assisted in restraining housing price growth, equity flows, credit growth, and bank leverage, with LTV caps, housing tax measures, and foreign currency related measures having the most impact.

An investigation for 12 Asian Pacific countries was also carried out by Bruno, Shim and Shin (2014) focusing on the relationship between capital management policies and macroprudential policies. They discovered that the banking sector and bond market capital flow management frameworks are effective in reducing down bank and bond inflows respectively. Some evidence was also discovered proposing that macroprudential policies are more successful through complementing monetary policy that is by reinforcing monetary tightening as opposed to when they operate in directions. Lim et al (2011), using the IMF survey data, discovered that a number of macroprudential tools, comprising caps on the loan-to-value ratio, caps on the debt-to-income ratio, ceilings on credit or credit growth, reserve requirements, countercyclical capital requirements and time-varying/dynamic provisioning, can lessen credit growth procyclicality. Dell'Araccia et al (2012) illustrated that the macroprudential policy, presented as a composite index of six tools, can possibly decrease the occurrence of credit booms and reduce the likelihood that booms end up badly. The existing studies also propose that several macroprudential instruments can be employed to rectify credit and real estate booms. Vandebussche, Vogel, and Detragiache (2012) discovered that the variations in the capital requirement and liquidity measures have an effect on the housing price rate of inflation in Central, Eastern,



and Southeastern Europe. Tovar et al (2012) indicated that the average reserve requirement ratio and other amalgamated types of macroprudential tools (dynamic provisioning, capital requirement etc.) have a moderate and transitory impact on the credit growth in five Latin American economies.

3.0 METHODOLOGY

3.1 Model Specification

The research model is according to the work of Schwartz (1995) who tested the relationship between financial stability and price stability (which are the proxies of macroprudential and monetary policies) using a set of macroeconomic variables. We analyse the interaction between macroprudential policy and monetary policy in two ways. Firstly we assess the interaction simply looking at the correlation between our three main variables which are financial stability, GDP growth and price stability. The Second approach employs a Vector Autoregressive model (VAR models) to study the interaction between monetary policy and macroprudential policy by also including a set of other macroeconomic variables. Even though observing the correlation between monetary and macroprudential policy is a comparatively simple and limited approach It does provide us with particular understanding on the question whether the monetary policy positively relates to macroprudential policy as suggested by Schwartz (1995). The latter approach gives us additional insight in how our variables relate as the VAR analysis integrates the dynamics between variables over multiple periods. As the Vector Autoregressive analysis is more complex it requires a sound methodological approach.

3.2 The VAR model

Numerous studies uses VAR models to test for the interaction between a set of variables for the reason that VAR models can be employed to study multivariate time series data and also account for their dynamic properties and interactions. (Carter Hill et al. 2008). The dynamic progress of multiple variables by their common history can be described by the VAR model as it clarifies one variable by its own lags and the lags of other involved variables. A standard VAR (p) model can be described by:

$$Y_t = \delta + \theta_1 Y_{t-1} + \dots + \theta_p Y_{t-p} + \varepsilon_t \quad (1)$$

Where Y_t is the $k \times 1$ vector encompassing our model variables, the constant vector is δ which is $k \times 1$, the matrix's coefficients of the variables are θ_j a $k \times k$, while the vector of the lag of all variables in the system is Y_{t-1} and finally ε_t which is the $k \times 1$ error terms vector (Verbeek, 2013). Each variable is therefore explained by its own lags and each other variables lags in the system. An imperative advantage

of this model is that the association between the variables ought not to be established on beforehand. Apparently all other variables are equally treated with no difference between endogenous and exogenous variables (Verbeek, 2013). We employ the VAR model to integrate the past dynamics of monetary policy and macroprudential policy.

The Vector Autoregressive model is a broad-spectrum framework which can be used to describe the relationship that exists between stationary variables. Therefore to use the VAR model correctly it should be firstly established whether all of our variables are stationary I (0) variables. It should also be taken into account in which case we may possibly run the regression in levels. In the event that the variables are nonstationary, it must be examined whether the variables are cointegrated or not and thus follow a common trend. If it happens that the variables are nonstationary and not cointegrated regression should be conducted by taking first differences. Conversely if variables are nonstationary and cointegrated adjustments of the approach will be made to allow for the cointegration between the nonstationary variables by employing a Vector Error Correction (VEC) model (Verbeek, 2013). The Vector Error Correction model is a restricted VAR model which is often designed to work in the event of cointegrated nonstationary series. The merit of using a VEC model for a cointegrated relationship within our model is that there is no need to give up valuable information about the cointegration in our series. Adjusted regression can also be conducted and also eliminating the risk of running a spurious regression (Carter Hill et al., 2008). An error correction term is added to the model by the VEC model which describes how the time series adjust to disequilibrium and corrects to the long term equilibrium. To perform these entire tests Eviews 7 statistical software package will be used.

4.0 RESULTS PRESENTATION & ANALYSIS

4.1 Descriptive statistics

The data selection results in a dataset containing 6 variables in 8 observations. The variables do not seem to have a constant mean and variance over time, which could be an indication of non-stationarity. The standard deviation indicates variability of data, the GDP growth rate has the smallest variability as indicated by a standard deviation of 0.062497, and the variable with greatest variability is leverage ratio with a standard deviation of 4.883468. The minimum and maximum descriptive help the study in checking for outliers and is efficient when applied to level data. No outliers detected for the included variables. Table 4 below provides further insight in the descriptive statistics of the dataset.

Descriptive statistics

Table 4. 1 Descriptive statistics

	CPI	GDP GROWTH	INTEREST	LEVERAGE RATIO	M2 GROWTH	MFCI
Mean	0.980731	0.080985	0.197375	11.77000	0.125026	0.287521
Median	0.863811	0.087747	0.161700	11.28500	0.101004	0.286208
Maximum	3.922235	0.154457	0.306000	19.12000	0.403458	0.568606
Minimum	-2.398710	0.006157	0.150800	5.060000	-0.009490	0.036470
Std. Dev.	2.340996	0.062497	0.065691	4.883468	0.138685	0.201538
Skewness	-0.116284	-0.041861	1.108660	0.139887	0.943511	0.113341
Kurtosis	1.585387	1.250403	2.299061	1.781523	2.989592	1.607025
Observations	8	8	8	8	8	8

4.2 Correlation between inflation, Macro Financial Condition index and GDP Growth

The first approach of this research to answer the question of how the monetary policy and the macroprudential policies interact is the calculation of the correlation coefficients of the three key objectives that is the Consumer price index (CPI), Macro Financial Condition index (MFCI) and GDP growth. According to the study conducted by Swartz (1995). The expectation is that the price stability (CPI)

should positively correlate with financial stability (MFCI). The findings presented in the table 4.2 below illustrates such a positive between these two variables in Zimbabwe between 2009 and 2017. The major macroeconomic variable which is the GDP growth does exhibits a significant correlation with both the Consumer price index and Macro financial condition index. The observations indicates that a rise in GDP growth cause an increase in the financial stability (or a decline in MFCI indicator) and an increase in inflation.

Table 4. 2 The Correlation between financial stability, Price stability and Gross Domestic Product.

Ordinary Covariance Analysis Included observations: 8	MFCI	GDP growth	CPI
MFCI	1.000		
GDP growth	-0.635 (0.00)	1.000	
CPI	0.124 (0.31)	0.285 (0.02)	1.000

*Significance level of each correlation is given in parenthesis.

In the computation of the VAR model, a sequence of necessary diagnostic tests of lag selection, stationarity, cointegration, and model specification were done and the following results were obtained

4.3 VAR Model: Lag length selection

The second foremost approach, the research makes use of is a VAR model estimate on the interaction between the variables described in chapter 3.10:1 consumer price index, annual GDP growth, the MFCI indicator, Annual M3 growth, the interest

rate, and Leverage. To choose the optimal amount of lags to be used in the model, the researcher applied the five lag selection tests provided by *Eviews 7.1*. The findings are presented in table 4.3 below.

The outcomes shown in table 4.1 illustrates that after the majority of the tests, the appropriate number of lags to be involved in the model is 1. This outcome is also comparable with the study according to Blot et al. (2015), who applied 2 lags in their Vector Auto Regressive (VAR) model in a comparable research.

Table 4. 3 Lag length selection

Lag	Log L	LR	FPE	AIC	SC	HQ
0	32.59149	NA	3.21e-10	-4.834816	-4.617782	-4.971626
1	2228.795	1597.239*	3.4e-180*	-397.5991*	-396.0798*	-398.5567*
2	-134.4120	89.65286	4.30e-05	5.680380	8.129677	6.643700
3	-992.9256	49.72342	2.60e-05	5.696050	9.37000	7.141030
4	-59.51057	31.37095	3.51e-05	5.778113	21.67671	7.704754
5	-34.74492	56.89734	4.43e-05	5.499839	10.62308	7.908140

Table 1: Lag order selected by the criterion marked by *. LR: sequential modified LR test statistic (each test at 5% level), FPE: Final Prediction Error, AIC: Akaike information criterion; SC: Schwarz information criterion.

4.4 VAR Model: Stationarity

It is essential to firstly establish if the variables of the model are stationary. The first step

was to analyze the data set visually. It was visually observed that the variables are not fluctuating through a linear trend except for the interest rate.

This is a logical consequence of the fact that the entire variables are growth rates in comparison to their previous years except the MFCI. The MFCI indicator is within a range of [0 and 1] and as a result the indicator is expected to be stationary. In order to obtain a definitive answer the Augmented Dickey Fuller test was conducted to test for stationarity the outcomes are presented in table 4.4 below.

The ADF test's null hypothesis is that the series contains a unit root and as a result non stationary. If this null hypothesis is rejected it

illustrates that the series does not have a unit root and possibly it would mean stationary data. The outcomes illustrated in table 4.4 shows that MFCI, GDP growth, Leverage ratio, Inflation and the M2 growth rate are not stationary at 5% significance level, therefore we fail to reject the null hypothesis of a unit root. The interest rate is the only exception because at 5% the unit root null hypothesis can be rejected illustrating that this variable is stationary. The null hypothesis can also be rejected at 10% level of significance for leverage and GDP growth variables.

Table 4. 4 Augmented Dickey-Fuller Test

Variable	Trend, intercept or no trend no intercept	T-statistic (p-value)
MFCI	Intercept	-2.592 (0.13)
GDP growth	None	-1.854 (0.08)
Leverage	None	-1.669 (0.07)
Interest rate	Trend and intercept	-3.701 (0.02)
CPI	Trend and intercept	-1.843 (0.62)
M2 growth	None	-0.735 (0.44)
ΔMFCI	None	-6.977 (0.00)
Δ GDP growth	None	-3.676 (0.00)
Δ Leverage	None	-2.833 (0.01)
Δ Interest	None	-3.745 (0.00)
Δ CPI	None	-5.000 (0.00)
Δ M2 growth	None	-4.780 (0.00)

**Significance level is given in parenthesis. Lag length selection by Akaike Info Criterion.*

The Phillips-Perron test was also applied to make the results more robust. The outcomes of this test is shown in in Appendix C. Through the use of this method the only variable that indicates to be stationary at 5% level of significance is the GDP growth, whereas for the entire variables we fail to reject the null hypothesis of unit root. The researchers had intuitively expected that the variables are likely to face less problems of stationarity. The variables leverage, GDP, inflation and M3 are all growth rates which generally proposes that the variables distribution does not change much in time. Concerning the MFCI a similar argument can be raised because it ranges between 0 and 1. As a way of making the outcomes more robust the model is run in levels. The obtained results and a comparison with the results obtained from the analysis below are illustrated in Appendix F, G and H. It is therefore concluded from the stationary tests illustrated above that all the variables

in their first differencing are stationary giving us proof that the entire variables are integrated in the order of I(1). As the entire variables are required to be I(0) to enable the regression to be done in levels, it is imperative to check if the variables are cointegrated.

4.5 VAR Model: Cointegration

The idea of checking if the variables are cointegrated is essential to see if a VAR or a VECM model should be used. The Johansen Cointegration test was used to conduct the cointegration test. To indicate the degree of cointegration in the model the Johansen Cointegration test make use of the Trace test as well as the Maximum eigenvalue test. To conduct the test 1 lag was included based on the obtained results presented above. The outcomes of this test are illustrated in the table 4.5 and 4.6 below.

Table 4. 5 Johansen Cointegration Test: Unrestricted Cointegration Rank Test (Trace Statistic)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Probability
None *	0.510549	113.1897	94.75366	0.0014
At most 1	0.383895	67.36944	68.81889	0.0659
At most 2	0.211840	36.32311	46.85613	0.4411
At most 3	0.152609	21.44368	28.79707	0.3832
At most 4	0.125735	8.831044	14.49471	0.3709
At most 5	0.008247	0.513132	3.941466	0.4236

Trace test indicates 1 cointegrating equation at the 0.05 level. * denotes rejection of the hypothesis at the 0.05 level

Table 4. 6 Johansen Cointegration Test: Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Probability
None *	0.510549	44.82025	41.07757	0.0131
At most 1	0.383895	32.04633	32.87687	0.0616
At most 2	0.211840	15.87943	28.58434	0.7477
At most 3	0.152609	12.71264	22.13162	0.5862
At most 4	0.125735	9.117912	15.26460	0.3769
At most 5	0.008247	0.593132	4.841466	0.4236

Max-eigenvalue test indicates 1 cointegrating equation at the 0.05 level. * denotes rejection of the hypothesis at the 0.05 level.

The maximum Eigenvalue and the Trace statistic reject to acknowledge that there are none cointegration equations at 5% level of significance. These approaches also have the same bottom line that at most 1 cointegration equation which cannot be rejected at 5% level of significance. After

conducting these diagnostic tests it can be concluded that the model contains only one cointegrating equation and the research will therefore use the VEC model for estimation. Godfrey LM test for autocorrelation

Table 4.7 Results of VAR test for serial correlation

lag	chi2	df	Prob>chi2
1	15.7789	9	0.07165
2	15.9245	9	0.06848
3	4.1701	9	0.89986
4	2.9889	9	0.96473
5	0.8968	9	0.99964

The results of Table 4 shows that the null hypothesis of no serial autocorrelation will be accepted for Godfrey LM test for all lags since their p-values are greater than the significance values of 0.05. Hence we can conclude that there is no serial autocorrelation.

4.6 Vector Error Correction Model

The outcome of the analysis presented above shows that the variables are not stationary and contains only one cointegration equation. Therefore the analysis was conducted using the VEC model. The best way to analyze the interaction and the causality that exist between the tools of the macroprudential and monetary policies it is ideal to derive the impulse response functions of the model. The presence of co-integration between variables suggests a long term relationship among the variables under consideration. The results of Appendix table F suggest that there is long run relationship between GDP growth, MFCI, CPI, Interest and Leverage ratio for one co-integrating vector for Zimbabwe in the period 2009-2017, since the correction error term

1(ce1) is significant and showing negative coefficient value. The error correction term indicates the rate at which the disequilibrium between the long-run and the short-run estimates are corrected for.

The results in VECM estimates show that on annual basis, 0.364% of the disequilibrium between the long-run and short-run estimates are corrected and brought back to equilibrium. This value is highly significant with a p-value of 0.0000 at 5% confidence level and a corresponding standard error of 0.087. The entire coefficients were significant at 1% level of significance. 1% appreciation of inflation (CPI) rate is likely to increase MFCI by 0.04918 % in the long-run and this estimate is significant. Also a 1% increase in M2 growth, MFCI is increased by 0.04632% in the long-run and the coefficient is significant. Also a 1% increase in GDP growth, MFCI is decreased by 0.03402% in the long-run and the coefficient is significant. Also a 1% increase in Leverage ratio, MFCI is decreased by 0.013414% in the long-run and the coefficient is significant

Table 4.7 Vector Error Correction Model Estimates

Variable	Coefficient	Standard error	T- statistic
CPI	0.04918	0.02968	1.67499
Leverage ratio	-0.013414	0.01477	-0.90805
M2 growth	0.004632	0.01360	-0.09546
Interest	0.046537	0.02680	0.88530
GDP growth	-0.03402	0.01923	-1.79913

Table 4.8 Results of VECM test for serial correlation

lag	chi2	df	Prob>chi2
1	23.8976	9	0.00447
2	12.5509	9	0.18400
3	25.7618	9	0.00223
4	11.9469	9	0.21632
5	5.2298	9	0.81383
6	9.0685	9	0.43098
7	13.8771	9	0.12677
8	10.8211	9	0.28817

The results of Table above shows that the null hypothesis of no serial autocorrelation will be accepted for Godfrey LM test for 6 lags out off the 8 lags since their p-values are greater than the significance values of 0.05 and 2 lags rejects the null hypothesis that there is serial autocorrelation. Hence we can conclude that there is no serial autocorrelation since the majority of the lags accept the null hypothesis.

4.7 Granger Causality Analysis

Here, the results for the analysis of causality are presented and the causality between the three main variables and the direction of the causality of the systems are determined using Granger Causality test. The results of the test are presented in table 4.9.

The result estimate shows that at 5% most of the variables are Granger-causal for GDP growth. However, there is unidirectional causality between GDP growth rate and MFCI. This finding implies that GDP granger cause inflation rate in Zimbabwe. Also there is bidirectional causality between Inflation rate and GDP growth, which implies that Inflation rate granger cause GDP growth and visa versa in Zimbabwe. Also there is unidirectional causality between Inflation rate and MFCI. There is a unidirectional causality between M2 growth rate and Inflation which mean the growth of M2 granger cause inflation. The Leverage ratio granger cause MFCI, there is a unidirectional causality.

Table 4.9: Granger Causality Test

Null Hypothesis	F-statistics	Probability	Decision
Inflation does not Granger-cause GDP	4.19711	0.0263	Reject
GDP does not Granger-cause Inflation	9.48715	0.0008	Reject
MFCI rate does not Granger-cause GDP	2.17496	0.1338	Do not reject
GDP does not Granger-cause MFCI	6.24427	0.0061	Reject
MFCI does not Granger-cause Inflation	4.06237	0.0292	Reject
Inflation does not Granger-cause MFCI	22.2754	2.E-06	Reject

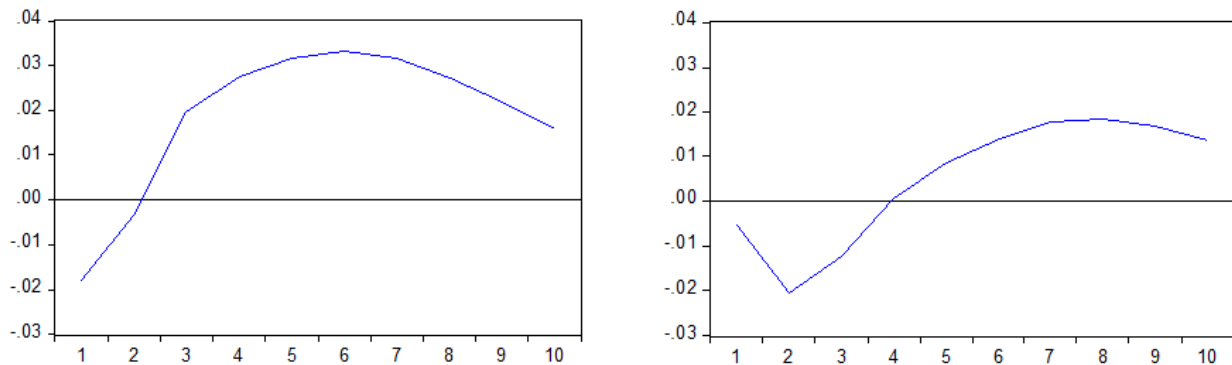
Source: Author's computation from the data, 2018

4.8 Impulse Response Function (IRF)

The impulse response functions will be able to measure the degree of one instrument to an impulse in another instrument in the model while keeping other instruments constant (Verbeek, 2013). Therefore to analyze the response of the other variable to this shock an impulse or a shock of one standard deviation is applied. Because this study's focus is on the macroprudential policy and monetary policy, the impulse response functions of the tools of these policies as well as GDP growth are presented in figure 4.1. The response to Cholesky one standard deviation is measured.

The response of financial stability indicator MFCI to CPI (Inflation) and GDP growth are displayed in figure 4.1 below. Consistent with the study according to Schwartz (1995) the outcome shows that a rise in inflation would cause to a higher value for MFCI in the long run specifying a decline in financial stability. This is an indication that low inflation promotes financial stability. The VEC estimates illustrated in appendix F also confirms the relationship and they reflect a significant positive impact on inflation on MFCI at 10% level of significance.

Figure 4 1 Response of MFCI to Inflation (CPI) (left) and to GDP growth rate (right)



The adverse effect of a rise in inflation on the financial stability establishes from the second period. Gambacorta (2009) researched the effect of a low rate of inflation on the financial stability and explained the reversed pattern and trend. He proposed that a low level of inflation as well as low inflation rates can possibly encourage the investors to search for opportunities with higher yields through engaging in more risky activities.

The MFCI can be positively affected by a negative shock of inflation and can reduce financial stability. On the other hand Schwartz (1995) proposed that in the long run the negative impact of inflation on financial stability through increased amplified uncertainty as well as shorter investment horizons. This became evident on the outcome of the analysis of the impulse response function of the

MFCI to GDP growth, it came out that GDP growth affects financial stability positively within the short run. The estimated VEC model indicated that the relationship between GDP growth and the MFCI at 10% level of significance is a significant negative relationship illustrating that the GDP growth would foster financial stability. Nonetheless the impulse response function in the long run shows that GDP growth can adversely affect the financial stability which can be best explained by the assumption that prolonged periods of economic growth and prosperity can lead result in increased risk taking.

The figure 4.2 illustrated below give a corresponding impulse response function for the relationship that exist between the level of inflation, GDP growth and financial stability.

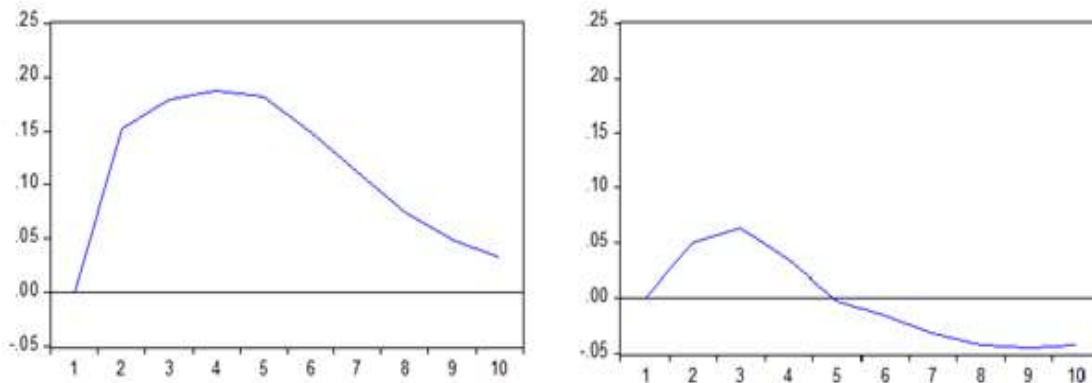
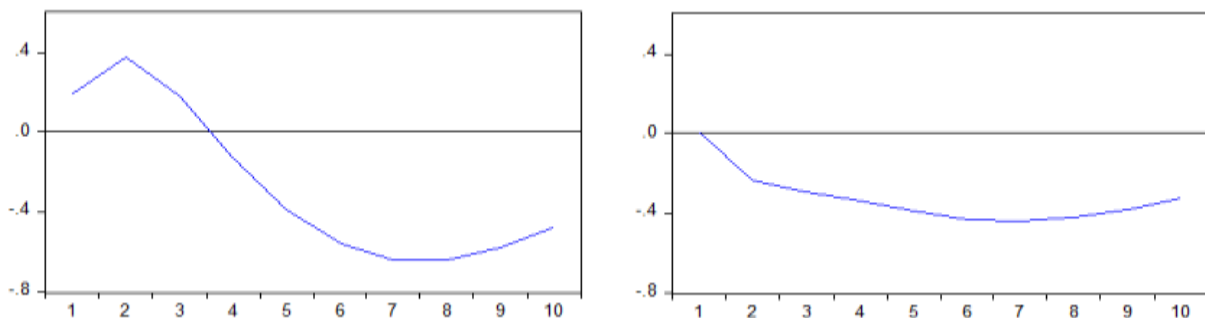
Figure 4 2 The Response of Inflation (CPI) to GDP growth (left) and to MFCI (right)

Fig 5 above illustrates that a rise in GDP growth would subsequently in the rate of inflation which poses a significant impact at 5% level of significance as indicated in the VEC model estimations. The association between the financial stability and the rate of inflation is less explicit. A rise in MFCI and consequently a decline in financial stability would result to an increase in the level of

inflation in the first five periods where after the rate of inflation would decrease. Conversely it is observed that the impact of financial stability on the rate of inflation is insignificant according to the VEC model estimations.

The GDP growth to the rate of inflation and MFCI impulse response are finally presented in figure 4.3.

Figure 4 3 The Response of GDP growth rate to Inflation (CPI) (left) and to MFCI (right)

The outcome of the impulse response function of the GDP growth rate to inflation (CPI) rate specifies that inflation rate increase would subsequently lead to a rise in GDP growth rate within the short run and a decline in GDP growth rate in the long run. Conversely the VEC estimations reflect that the impact of inflation on the GDP growth rate is not significant. The impact of financial stability is evident. A rise in MFCI and consequently a decline of financial stability would adversely affect the GDP growth rate. This impact is significant when tested at 10% level of significance. The estimations of the VEC model moreover identifies a significant positive association between leverage to GDP growth rate as well as a positive significant impact on GDP growth rate.

It can be observed according to the analysis above that the monetary policy; macroprudential policy and GDP growth rate are highly interacting. Evidence is available consistent to the study

hypothesis that the price stability improves financial stability is significant whilst the GDP growth rate also meaningfully impacts both fields. A similar significant impact is not observed on the effect of macroprudential policy on the rate of inflation. Regardless of the bottom line that price stability enhances financial stability. It cannot be finalized that price stability is an adequate condition for financial stability in Zimbabwe. This is consistent with the case of the Global financial crisis a relatively stable inflation rate before 2007 failed to curb the rapid global financial instability to develop. Furthermore it can be observed from the estimation of the model that the policy instruments for macroprudential policy and monetary policy works across all three fields that is there are potentially interacting, also complementary in some circumstances or even conflicting at times.

The Monetary policy regime and inflation rate have an effect on the real economy and financial

stability, whilst macroprudential instruments can correspondingly have an impact on credit growth, the potential imbalances and consequently the level of economic prosperity and price stability. The outcomes supporting mutual dependence of these three fields and the reflection that monetary policy might be applicable but does not warrant financial stability. The findings intensifies the debate

regarding what role should the monetary play in safeguarding financial stability as well as how the roles and responsibilities for the policy makers in these fields should be divided.

4.9 Hypothesis Testing

Table 4.10 below shows the regression analysis results obtained for testing the study hypothesis H2.

Table 4.10 ANOVA

Model		Sum Squares	df	Mean Square	F	Sig.
1	Regression	.510	4	.128	.191	.943 ^b
	Residual	89.576	134	.668		
	Total	90.086	138			

a. Dependent Variable: GDP growth

b. Predictors: (Constant), MFCI, CPI

An ANOVA test was conducted and as shown in Table 4.10, the p-value (0.943) > 0.001 and as such the hypothesis (H1) which states that the interaction of macroprudential and monetary policy does not have an impact on economic performance will be rejected.

Table 4.11 below shows the regression analysis results obtained for testing the study hypothesis H1.

Table 4.11 ANOVA

Model		Sum Squares	df	Mean Square	F	Sig.
1	Regression	2.143	7	.306	.460	.862 ^b
	Residual	88.594	133	.666		
	Total	90.738	140			

a. Dependent Variable: MFCI

b. Predictors: (Constant), CPI

An ANOVA test was conducted and as shown in Table 4.11, the p-value (0.862) > 0.001 and as such the hypothesis (H2) which states that Price stability does not improve financial stability will be rejected.

4.10 Monetary and Macroprudential Policy: Complements, not Substitutes

The influence of this research on actual monetary policy decisions has been only modest, although financial stability concerns are becoming more frequently discussed in the context of monetary policy. Just as micro- and macroprudential policies play central roles in safeguarding financial stability, so does monetary policy. In particular, a monetary policy that fails to take into account building systemic or tail risks exposes the economy to potential large setbacks in the future. Research points to the effect monetary policy has on several aspects of risk-taking. For example, after taking into account economic conditions, low policy rates are correlated with overall easier financial conditions, as we see banks increase the share of risky assets they hold, credit quality decline, risk premiums on syndicated loans fall, lending standards soften, and financial institutions move towards shorter-term funding and higher leverage. Many of these factors manifest themselves in elevated asset valuations and rising

credit growth. Once asset values or credit growth has risen to a level warranting concern, it is likely too late for the monetary to prudently unwind the imbalances without triggering a sharp reversal that ultimately inflicts damage on the real economy.

Monetary policy runs the risk of remaining overly accommodative following a downturn, and lead to future instability. Importantly, policymakers should reassess the assumption that monetary policy and macroprudential regimes can be used independently. This “separation principle” remains widely accepted and continues to argue that macroprudential tools offer the “first line of defense” against risks to financial stability. The Zimbabwean’s recent experience, combined with empirical evidence, suggests this view should be challenged. A comprehensive approach that views monetary and macroprudential policy as a complements, reinforced by sound microprudential underpinnings, is the best approach to achieve a stable financial system and the long-run objectives of central banks for sustainable economic growth

Some Asian and Latin American country authorities have used macroprudential instruments such as caps on the LTV with other policies, for example, monetary and fiscal policies. Some Eastern



European countries have kept fiscal policy loose, but tightened monetary policy and attempted to contain banks' foreign currency lending through various macroprudential measures. The combined use of policy tools typically occurs when the credit cycle coincides with the business cycle and there is a generalized risk of excessive credit growth and economic overheating. In such cases, macroprudential instruments are implemented as part of a larger policy action to curb excess demand and the build-up of systemic risk, so they play a complementary role to macroeconomic policies.

The combined use of macroprudential instruments with monetary and fiscal policy tools in addressing systemic risk tends to be more effective when financial sector risks intertwine with those in other sectors or the financial cycle coincides with the business cycle. In general, macroeconomic policies should always be the primary tool to use when the source of systemic risk is domestic demand imbalances. In particular, macroprudential policy should be used only as a complement to monetary policy, which is more blunt and potent in addressing excess demand. On the other hand, macroprudential policy is better suited to target specific sectors, and should be used primarily to increase the resilience of the financial system. In any event, mechanisms should be established to address coordination challenges and limit any potential policy conflicts.

4.11 Effectiveness of the Macroprudential instruments

Macroprudential instruments may be effectively applied to address specific risks if used appropriately. According to the IMF survey, most country authorities who have used macroprudential instruments believe that they are effective. To assess the effectiveness of macroprudential instruments more thoroughly, this study used different approaches. The first is a case study, involving a correlation of the use of instruments to see if there are negatively or positively related. The second is VECM which used impulse response function to assess the reaction of macroprudential instruments on various target variables. Macroprudential instruments seem to have been effective in reducing the correlation between credit and GDP growth. In other studies the countries that have introduced caps on the LTV, DTI and reserve requirements, the correlation is positive but much smaller than in countries without them. In countries that have introduced ceilings on credit growth or dynamic provisioning, the correlation between credit growth and GDP growth became negative. The difference in the correlations was also statistically significant, except in the case of caps on foreign currency lending and restrictions on profit distribution.

The usual caveats, of course, apply to the evaluation. First, data availability and quality present challenges. Firm level data are preferable since many of the macroprudential instruments are aimed at the

balance sheet of financial institutions, but these are not readily available or consistent over time or across countries. Moreover, the number of countries that have used macroprudential instruments in a systematic way is small since macroprudential policy frameworks have been put in place only recently, limiting the degree of confidence in any statistical analysis. In addition, establishing causality is not straightforward, or even feasible in some cases, with a selection bias that favors high risk countries where policies are implemented in reaction to adverse economic or market developments. The empirical analysis also does not take into account issues such as costs and distortions, important factors to consider when using the instruments. These caveats notwithstanding, the evaluation still provides valuable insights into the effectiveness of macroprudential instruments

5.0 CONCLUSION AND POLICY RECOMMENDATIONS

5.1 Conclusion

The conclusions that follow are centered on the findings derived from the previous chapter as well as theoretical and empirical postulations:

- i. In conclusion, the estimates of the impact of MFCI, and inflation on GDP growth for Zimbabwe suggest that there exists a long run relationship between the monetary policy variables and macroprudential policy. Precisely, these findings suggest that the contribution of inflation rate to Zimbabwe financial stability is about 0.049, with significant contribution in the growth model. However, Leverage and GDP has a negative contribution with significant contribution in the model too. Considering the fact that the decline in MFCI indicates increased financial stability. It means that economic growth is conducive for financial stability. Too high leverage is detrimental to financial stability. Excess liquidity is also bad for financial stability from the results it is positively correlated with MFCI.
- ii. The Impulse Response Functions results show that a unit shock of inflation rate to GDP creates strong fluctuations. Also an initial response of MFCI to a shock in Inflation rate creates slight fluctuations and finally dies off. In the response of inflation to a shock in GDP creates also strong fluctuations, this confirms the bi-directional causality between these two variables. Finally, in the response of Inflation to a shock in M2 growth creates strong fluctuations; this implies how the interaction of these two policies affects macroeconomic performance.



- iii. The outcomes and the discussion of this research indicated that the macroprudential and monetary policies in Zimbabwe are intrinsically linked to each other. As a result the dichotomy between the macroprudential and the monetary policy is a false one. As discussed above the monetary policy does affect financial stability whilst the macroprudential policy which promotes financial stability and have an impact on monetary policy. In the event that the macroprudential policy is implemented to avert a credit bubble, credit growth will consequently be slowed which will also slow aggregate demand growth. In this scenario and in order to offset weaker aggregate demand the monetary policy framework needs to be contractionary.
- iv. The study revealed that when a financial system is overleveraged, it is vulnerable to external shocks such as disorderly reversals in capital flows or rapid changes in asset prices. If equity buffers are not large enough to absorb the resultant losses, institutions may be forced to deleverage and create sharp declines in the supply of external financing to the real economy.
- v. Monetary and macro-prudential policy instruments are thus two different sets of tools, that sometimes have to adopt different stances but whereas in some situations, may share common goals. There are anyhow important synergies and interactions between the two policy functions.

5.4 Recommendations

- i. The RBZ and government policy makers should craft policy measures that guarantee inflation rate stability so as to influence interest rate spreads downwards.
- ii. If the policy rates are maintained to be low in order to stimulate the economy, there will be a greater risk that a credit bubble may occur. This might require a contractionary macroprudential policy to safeguard that a credit bubble does not occur.
- iii. Consideration of the financial cycle stage is essential for the determination of the deployment of types of policy instruments. For instance both macroprudential and monetary policies strategies can be adopted during economic recovery to encourage and motivate banks to build up capital and liquidity buffers.
- iv. The macroprudential indicators should be deployed for the analysis of bank credit standards and provisioning of loans whilst the macroprudential supervisors would instead use the necessary tools for the monitoring of systemic risks. This kind of

scenario is referred to as the “paradox of financial instability”, for the reason that the financial system seems to be at its strongest when it can also be at its most vulnerable state

- v. The Reserve Bank plans may tackle the deteriorating quality of assets in the banking system. Given the impact of high level of non-performing loans (NPLs) on financial stability and economic growth, the Reserve Bank should develop a framework to address the problem.
- vi. The establishment of a credit reference system which will enable the warehousing of valuable credit information on individuals’ and corporate entities’ borrowing history and their repayment patterns and promote effective credit risk management by the banking institutions is necessary.
- vii. Financial system stability is expected to improve on account of an operational lender of last resort facility, recapitalisation of the Reserve Bank, creation of a credit reference bureau, clean up of non-performing loans and the positive rebuild of confidence in the financial services sector.
- viii. The minimum capital requirements should be revised in line with Basel III accord in order to promote flexibility in the financial sector, with both large and small institutions that are strong and profitable. In the banking sector, the revision which is in line with the Banking Act, will result in three tiers of banks, each with a different minimum capital requirement and a different set of allowed activities
- ix. The Reserve Bank should develop a framework for Contingency Planning and Systemic Crisis Management which outlines a set of monetary and macroprudential policy actions and processes necessary for the prevention, management and containment of banking systemic distress and crisis.
- x. Cognisant of the fact that payment systems efficiency must be augmented with payment systems soundness in order to promote overall stability; the Reserve Bank should enforce minimum requirements which are informed by international best practices.
- xi. The Government should Improve default conditions in the financial sector which is also dependent on the improvement of liquidity conditions in the economy, general improvement in disposable incomes and an increase in aggregate demand for locally produced goods. In the absence of significant FDI inflows and offshore credit



- lines, liquidity conditions are likely to remain largely constrained.
- xii. The Government should develop an active money market, absence of an active money market has led investors to scramble for the safe assets on the properties market. This has seen a sustainable increase in property prices and rentals since the advent of the multicurrency system. The attractive returns currently obtainable on the properties market coupled with depressed new properties developments has presented scope for a property bubble. The bubble is however, currently being countered by the liquidity challenges facing the economy.
- xiii. There is a need for robust credit services; absence of robust credit reference services has heightened the possibility of an unsustainable household debt. Banking institutions should try to mitigate this by restricting consumer loans to individuals who receive their salaries through them.
- xiv. In view of the multifaceted and multi-dimensional nature of financial stability, a Multidisciplinary Financial Stability Committee that was established in 2012 should incorporate all financial sector regulatory agencies. The committee should champion the promotion financial stability, exchanging of ideas and making policy recommendations on financial sector stability.
- xv. Government should address issues of trust and confidence in the banking sector and phase out the bond notes. The bond note cannot qualify as a store of value as it is founded on a non-existent notion of value (a liability backed by another liability). By design, the note is self-depreciating in that it is backed by foreign debt.
- xvi. The central bank have created money out of thin air, unless of course it withdraws the bond notes when the facility expires, in which case the bond notes should carry an expiry date. As to whether the bond notes will be withdrawn upon expiration the financial stability will be at stake.

REFERENCES

1. Angelini, P., Neri, S., Panetta, F. 2012. *Monetary and Macprudential Policies*. ECB Working Paper Series, No. 1449: 1-34.
2. Angelini, P., Neri, S., Panetta, F. 2014. *The Interaction between Capital Requirements and Monetary Policy*. *Journal of Money, Credit and Banking*, 46(6): 1074-1112.
3. *Bank for International Settlements*. 2011. *Central Bank Governance and Financial Stability: A report by a Study Group*. May 2011: 1-83.
4. *Basel Committee on Banking Supervision*. 2014. *Basel III leverage ratio framework and disclosure requirements*. *Bank for International Settlements: 1-19*.
5. *BCBS 2010a*. *International framework for liquidity risk management, standards and monitoring*. *Basel Committee on Banking Supervision*.
6. *BCBS 2010b*. *Strengthening the resilience of the banking sector*. *Basel Committee on Banking Supervision*.
7. *BCBS 2010c*. *The Basel Committee's response to the financial crisis: report to the G20*. *Basel Committee on Banking Supervision, October 2010*.
8. Beck, T., Gros, D. 2013. *Monetary Policy and Banking Supervision: Coordination instead of separation*. *CEPS Policy Brief, No. 286: 1-8*.
9. Blot, C., Creel, J., Hubert, P., Labondance, F., Saraceno, F. 2015. *Assessing the Link between Price and Financial Stability*. *Journal of Financial Stability*, 16: 71-88.
10. Boeckx, J., Ilbas, P., Kasongo Kashama, M., De Sola Perea, M., Van Niewenhuyze, Ch. 2015. *Interactions Between Monetary and Macprudential Policies*. *National Bank of Belgium Economic Review, September 2015: 7-27*.
11. Borio, C. 2014. *Monetary Policy and Financial Stability: What role in prevention and recovery?* *BIS Working Papers, No. 440: 1-23*.
12. Borio, C., Lowe, P. 2002. *Asset prices, financial and monetary stability: exploring the nexus*. *Bank for International Settlements Working paper, No. 114: 1-39*.
13. Bridges, J., Rossiter, N., Thomas, R. 2011. *Understanding the recent weakness in broad money growth*. *The Bank of England Quarterly Bulletin*, 51 (1): 22-35.
14. Brunnermeier, M., Sannikov, Y. 2016. *The I theory of Money*. *Unpublished working paper*. *Princeton University: 1-62*.
15. Carlstrom, C.T., Fuerst, T.S., Paustian, M. 2010. *Optimal Monetary Policy in a Model with Agency Costs*. *Journal of Money, Credit and Banking*, 42(6): 37-70.
16. Carmassi, J., Gros, D., Micossi, S. 2009. *The Global Financial Crisis: Causes and Cures*. *Journal of Common Market Studies*, 47(5): 977-996.
17. Carter Hill, R., Griffiths, W.E., Lim, G.C., 2008. *Principles of Econometrics*. *Hoboken: Wiley*.
18. Claessens, S., Ghosh, S., Mihet, R. 2013. *Macprudential policies to mitigate financial system vulnerabilities*. *Journal of International Money and Finance*, 39: 153-185.
19. Claessens, G., Darvan, Z. 2015. *The Financial Stability Risks of Ultra-Loose Monetary Policy*. *Bruegel Policy Contribution, No. 3: 1-16*.
20. *Committee on International Economic Policy and Reform*. 2011. *Rethinking Central Banking*. *Report of the Committee on International Economic Policy and Reform, September 2011: 1-37*
21. Criste, A., Lupu, I. 2013. *The central bank policy between the price stability objective and promoting financial stability*. *Procedia Economics and Finance*, 8; presented at the 1st International



- Conference 'Economic and Scientific Research – Theoretical, Empirical and Practical Approaches', ESPERA 2013; 219-225.*
22. Crotty, J. 2009. Structural causes of the global financial crisis: a critical assessment of the 'new financial architecture'. *Cambridge Journal of Economics*, 33: 563-580.
23. Dabrowski, M. 2016. Interaction between monetary policy and bank regulation: lessons for the ECB. *CASE Networks Studies & Analyses*, No. 480: 3-30.
24. Davidson, R., Mackinnon, J. 1993. *Estimation and Inference in Econometrics*. New York: Oxford University Press.
25. De Paoli, B., Paustian, M. 2013. Coordinating Monetary and Macroprudential Policies. *Federal Reserve Bank of New York Staff Report*, 653: 1-48.
26. Del Ariccia, G., Laeven, L., Suarez, G. 2016. Bank Leverage and Monetary Policy's Risk-Taking Channel: evidence for the United States. *ECB Working Paper Series*, No. 1903: 1-70.
27. Deutsche Bundesbank. 2015. The importance of macroprudential policy for monetary policy. *Deutsche Bundesbank Monthly Report March 2015*: 39-71.
28. EBA, 2015. *EBA Report on the range of practices regarding macroprudential policy measures, Communicated to the EBA, July 2015*: 1-44.
29. ECB, 2007. The impact of short term interest rates on bank-risk taking. *Financial Stability Review*, pp. 163-167.
30. ECB, 2011. The Supply of Money- Bank Behaviour and the Implications for Monetary Analysis. *Monthly Bulletin*, October 2011: 63-79.
31. ECB. 2015. *Financial Stability Review, Rapport of May 2015*.
32. Eijffinger, S.C.W., Schaling, E., Hoeberechts M. 1998. Central Bank Independence: A Sensitivity Analysis. *European Journal of Political Economy*, 14(1): 73-88.
33. ESRB, 2016. A review of Macroprudential Policy in the EU in 2015, *European Systemic Risk Board, May 2016*: 1-57
34. Gadanez, B., Jauaram, K. 2009. Measures of Financial Stability- a review. *IFC Bulletin- Bank for International Settlements*, No 31: 365-380.
35. Galati, G., Moessner, R. 2013. Macroprudential Policy- A Literature Review. *Journal of Economic Surveys*, 27(5): 846-878.
36. Gambacorta, L. 2009. Monetary policy and the Risk Taking Channel. *BIS Quarterly Review*: 43-53.
37. Gambacorta, L., Marques-Ibanez, D. 2011. The Bank Lending Channel: Lessons from the Crisis. *Economic Policy*, 26(66): 135-182.
38. Gambacorta, L., Shin, H.S., 2016. Why bank capital matters for monetary policy. *BIS Working Papers*, No. 558: 1-28.
39. Gelain, P., Illbas, P. 2014. Monetary and Macroprudential Policies in an Estimated Model with Financial Intermediation. *National Bank of Belgium, Working paper research 258*:1-48.
40. Gerba, E., Macchiarelli, C. 2015. Interaction between monetary policy and bank regulation: Theory and European practice. *SRC Special Paper*, No. 10: 1-19.
41. Gersl, A., Hermanek, J. 2007. Financial Stability Indicators: Advantages and disadvantages of their use in the assessment of financial system stability. *CNB Financial Stability Report 2006, 2007*: 69-79.
42. Giavazzi, F., Giovannini, A. (2010, July). The low-interest-rate trap. <http://www.voxeu.org/article/low-interest-rate-trap>
43. Gilchrist, S., Zakrajsek, E. 2012. Credit Spreads and Business Cycle Fluctuations. *American Economic Review*, 102(4): 1692-1720.
44. Holló, D., Kremer, M., Lo Duca, M. 2012. CISS-A Composite Indicator of Systemic Stress in the Financial System. *ECB Working Paper Series*, No 1426: 1-49.
45. IMF, 2013. The Interaction of Monetary Policy and Macroprudential policies. *IMF Report*, 1:34.
46. Johansen, S. 1988. Statistical Analysis of Cointegration Vectors. *Journal of Economic Dynamics and Control* 12(2-3): 231-254.
47. Johansen, S. 1991. Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models. *Econometrica*, 59(6): 1551-1580.
48. Johansen, S. 1995. *Likelihood-Based Inference in Cointegrated Vector Autoregressive Models*. New York: Oxford University Press.
49. Kydland, F., Prescott, E. 1977. Rules Rather than Discretion: The Inconsistency of Optimal Plans. *Journal of Political Economy*, 85 (3); pp. 473-492.
50. McLeay, M., Radia, A., Thomas, R. 2014. Money Creation in the modern Economy. *Quarterly Bulletin 2014 Q1*, (Bank of England): 13-26.
51. Mishkin, F., 1996. The Channels of Monetary Transmission: Lessons for monetary policy. *NBER Working Paper*, No. 5464: 1-29.
52. Ongena, S., J. Peydo. 2011. Loose Monetary Policy and Excessive Credit and Liquidity Risk-taking by Banks, in: T. Beck, ed. *The Future of Banking*. London: Centre for Economic Policy Research (CEPR): 21-29.
53. Oosterloo, S., De Haan, J. 2003. A Survey of Institutional Frameworks for Financial Stability. *Occasional Studies, De Nederlandsche Bank*, 1 (4): 3-60.
54. Peek, J., Rosengren E., Tootell, G. 1999. Is Bank Supervision Central to Central Banking? *Quarterly Journal of Economics*, 114, 629-53.
55. Quint, D., Rabanal, P. 2014. Monetary Policy and Macroprudential Policy in an Estimated DSGE Model of the Euro Area. *International Journal of Central Banking*, 10(2): 169-236.
56. Romer, D.. 2012. *Advanced Macroeconomics*. New York: McGraw-Hill.
57. Schwartz, A.J. 1995 Why Financial Stability Depends on Price Stability. *Economic Affairs*, 154: 21-25.
58. Smets, F. 2014. Financial Stability and Monetary Policy: How Closely Interlinked? *International Journal of Central Banking*, 10(2): 263-300.
59. Smits, R., 2015. *The Crisis Response in Europe's Economic and Monetary Union: Overview of*



Legal Developments, Fordham International Law Journal, 38: 1135:1192.

60. Van de Laar, A.A.J. 2015. *The Enhanced Role of the European Central Bank: Consequences for independence and accountability. Master Thesis Erasmus University: International and European Public Law: 1-59.*
61. Van Marrewijk, C. 2007. *International Economics: Theory, Application and Policy. New York: Oxford University Press.*
62. Verbeek, M. 2013. *A Guide to Modern Econometrics. 4th ed. Hoboken: Wiley.*
63. Wadhani, S. 2010. *What Mix of Monetary Policy and Regulation is Best for Stabilizing the Economy. In The Future of Finance: The LSE Report: 145-163.*