Financial Stability and Macroprudential Policy

by

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I declare that Financial Stability and Macroprudential Policy is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

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ABSTRACT

A key lesson learnt from the 2007-2009 global financial crisis was that central banks focused too much on price stability and monetary policy. Financial stability and macroprudential policy were the missing pillars to ensure proper supervision of the financial system. This study examines the challenges faced by central banks in implementing macroprudential policies, while having limited experience as to the effect on their economies. The countercyclical capital buffer is generally considered to be one of the main macroprudential policy instruments. Using South African data, the study furthermore calculates the credit gap which serves as early warning indicator of excessive credit growth and is used to determine the point at which a countercyclical capital buffer should be activated for banks. The calculation of the countercyclical buffer indicates that the credit gap remains below the lower threshold of the buffer add-on. Hence, there is no reason to consider a capital add-on for South African banks as yet. Despite the overall reliability of the credit gap, concerns remain on its reliability under certain circumstances.

Key terms:

Macroprudential policy, financial stability, monetary policy, microprudential policy, systemic risk, procyclicality, countercyclical capital buffer, credit-to-GDP gap, liquidity crisis, financial cycle

DEDICATION

I humbly dedicate this work to my parents Ronnie and Savy Pillay for their inspiration, determination and sacrifices which saw me through my school and university years.

I also wish to dedicate this to my husband Kevin Rooplall and daughters Micara and Jenhara for their endless love and support.

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TABLE OF CONTENTS

CHAPTER ONE

INTRODUCTION

CHAPTER TWO

THE 2007-2009 GLOBAL FINANCIAL CRISIS – DESCRIPTION AND CAUSES

CHAPTER THREE

LESSONS LEARNT FROM THE CRISIS AND SALIENT FEATURES OF MACROPRUDENTIAL POLICY

CHAPTER FOUR

DIFFERENT TYPES OF MACROPRUDENTIAL INSTRUMENTS AND THE INTERACTION BETWEEN MONETARY POLICY AND FINANCIAL STABILITY

CHAPTER FIVE

CALCULATING THE COUNTERCYCLICAL CAPITAL BUFFER ADD-ON FOR BANKS IN SOUTH AFRICA

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

CHAPTER ONE

INTRODUCTION

1.1 CONTEXT AND BACKGROUND

Prior to the global financial crisis of 2007-2009, there was general agreement amongst policymakers that global monetary policy was working well, as evidenced by a long period of stable inflation and well-anchored inflation expectations. In addition, most mainstream economists largely ignored the interaction of banks with the macro economy, and failed to understand the US housing boom and feedback loops between the financial system and the real economy (Kumhof and Jakab, 2016).

On the regulatory side, monetary policy was aimed at price stability and regulators were satisfied that financial institutions were properly supervised and financially sound. The International Monetary Fund (IMF, 2009a), however, argued that during these years of economic boom and low inflation, central banks were too focused on inflation and failed to identify risks associated with growing macroeconomic imbalances such as excessive house price rises and dangerously high levels of leveraging among financial institutions, particularly in the United States (US), that eventually resulted in a build-up of massive systemic risks in the financial sector as a whole. Excessive house price increases generally refer to sharp and unsustainable increases in property valuations relative to incomes, price-to-rent ratios, and other economic indicators of affordability. When the housing bubble eventually burst in 2007, the US financial system was severely exposed.

Former Federal Reserve Board (Fed) Chairman Alan Greenspan was often criticised for "engineering" the housing bubble by keeping US policy rates too low for too long (Taylor, 2009). Low interest rates, coupled with excess market liquidity, sparked a search for higher returns among global investors, which eventually led to the rapid and widespread adoption of financial innovations such as complex derivative and structured finance products. Many of the new structured investment vehicles such as collateralised debt obligations were

complex instruments that were difficult to understand, even by those mortgage lenders who repackaged and issued them.

As a result, the US regulatory framework failed to adequately regulate financially innovative banking products, with particular reference to the so-called “shadow banking system”. The shadow banking system, which included investment banks, hedge funds and mortgage originators, was largely unregulated and not subject to Basel II prudential capital requirements. Over time, most of these institutions experienced high levels of growth and became highly interconnected, overly leveraged and systemically important, which financial regulation failed to detect. Market participants ignored the high levels of risk underlying new instruments that were designed to meet the needs of investor demand for higher yields. Financial institutions could take excessive risks which resulted in systemic banking instability (Levine, 2010: p1). A further risk was the increased reliance by most commercial banks on funding through money markets instead of the more stable funding through retail deposits.

Bernanke (2010a) also argued that it was not just low policy rates, but also regulatory failure that contributed to the bursting of the US housing bubble in 2007 and the subsequent financial crisis. The concept of financial stability was not well understood by regulators who paid too little attention to the interconnectedness and systemic importance of financial institutions such as Lehman Brothers and Northern Rock and too much attention to the supervision of individual financial institutions. Central banks depended too much on conventional monetary policy as well as microprudential measures which focused on the health and soundness of individual banks in the financial sector and did not take into account banks' collective behaviour-induced risks.

A general consensus emerged that ineffective regulation and monitoring was one of the main causes of the crisis. Whilst conventional monetary policy was aimed at achieving price stability by setting the interest rate at appropriate levels, it was not really focussed on detecting the build-up of asset price bubbles, largely ignoring endogenous risks and the interconnectedness between individual financial players as well as between the financial system and the rest of the economy (Persaud, 2009). In essence, lessons learnt from the crisis have illustrated that price stability

is not a pre-condition for financial stability or an indication of effective macroprudential policy.

The Bank of England (BoE, 2009) was also of the view that financial stability and macroprudential policy were the missing pillars required to fill the gap between monetary policy and the conventional microprudential regulation of financial institutions. The BoE (2009: p4) provides the following definition of financial stability: "Financial stability prevails where the financial system is sufficiently resilient that worries about bad states of the world do not affect confidence in the ability of the system to deliver its core services to the rest of the economy." "Bad states of the world" refer to economic recessions and other negative factors such as large and unsustainable current account deficits (where a country is unable to secure financing for the deficit), high levels of debt accumulation, local asset price bubbles and their subsequent bursting, and high default risk within or between countries. These negative factors are also referred to as macroeconomic imbalances and can pose risks to a financial system as a whole. Such imbalances may also reflect discrepancies between saving and investment rates and differing capabilities of financial institutions to intermediate between borrowers and savers. The result may be large cross border capital flows to fill these gaps.

Against this backdrop and since the onset of the crisis, the terms "macroprudential policy" and "financial stability" have become common currency and have changed central banking discourse globally. At present, there are various other definitions of macroprudential policy by different international organisations. In the Group-of-Twenty (G20) Seoul Summit document (November 2010: paragraph 40), the IMF, Bank for International Settlements (BIS) and Financial Stability Board (FSB) define macroprudential policy as using prudential tools to limit systemic or system-wide financial risk that can pose serious consequences for the real economy.

This could be achieved by dampening the build-up of macroeconomic imbalances, which arise in the form of deviations in trends of credit and asset prices during periods of booms and busts (Assenmacher-Wesche & Gerlach, 2009) and, by identifying and addressing common exposures and risk linkages that are sources of contagion and spillover risks that may threaten the functioning of the system as a whole.

Similarly, Borio (2011) views macroprudential policy as a calibration of regulatory and supervisory arrangements from a systemic point of view rather than from the efficiency of individual financial institutions. This point of view follows a top-down approach which assesses the soundness of the financial system as a whole and then reviews the health of individual financial institutions, as opposed to the bottom-up approach implicit in traditional microprudential policy.

A new regulatory framework was envisaged to "marry" microprudential supervision with macroprudential policy. Macroprudential policy has the aim of dealing with systemic risk on a macro level by reducing procyclicality and common exposure and interlinkages of the financial system. According to Ingves (2011), an important component of the macroprudential framework is the design of the governance arrangements which are necessary to ensure that the regulator responsible for macroprudential policy has a clear mandate to promote financial stability, has access to the correct information and proper analytical skills to set policy, and exerts sufficient control over a toolkit of macroprudential tools to achieve its mandate. Whilst many macroprudential measures have been identified, there has not been wide consensus among policymakers on what the primary instrument of macroprudential policy should be (BIS, 2010a), analogous to the policy interest rate as the primary instrument of conventional monetary policy.

The IMF (2011a: p8) recognised some of the most frequently used instruments that can be used to address systemic risk, which include measures for credit-related, liquidity-related and capital-related risks. Credit-related measures include limits on the loan-to-value (LTV) ratio, loan-to-income (LTI) ratio and debt-to-income (DTI) ratio, foreign currency loans and credit growth. Liquidity-related measures consist of reserve requirements, capital controls and limits on currency mismatches and liquidity funding ratios'. Finally, capital-related measures include countercyclical capital buffers, leverage ratios and capital add-ons for global systemically important banks (SIBs) as well as dynamic loan provisioning.

When regulators choose these macroprudential tools, it is important that they consider factors such as the stage of economic development of a country and its financial sector, the type of exchange rate regime (that is, fixed or managed), and the type of shocks to which its economic position is vulnerable. For example, a

country which is highly reliant on capital inflows to finance its current account deficit is particularly vulnerable to a reversal of these flows. Similarly, a country which is highly dependent on commodity exports for its economic prosperity is particularly vulnerable to fall in commodity prices. Several emerging markets have recently been negatively affected by such economic shocks.

When considering the design of a macroprudential framework, it is imperative that macroprudential instruments be compatible with other policy objectives. Where there are overlaps between the use of microprudential policy and macroprudential policy, mechanisms need to be put in place to ensure consistency. For example, the recent crisis has shown that loose monetary policy (long periods of low policy rates) can result in excessive risk-taking by financial institutions, which causes higher credit growth and leverage and creates systemic weaknesses in the financial sector. Low interest rates results in lower borrowing costs which encourages borrowing by individuals to purchase residential housing, which is one possible cause of house price increases.

This was evident in the pre-crisis years as house prices rose sharply in many countries and consumers became highly indebted. When the housing bubble burst in the US in 2007, several banks came under acute financial stress which caused weaknesses in the financial system as they could not refinance themselves through their ordinary sources, and had to be rescued by government and central bank bailout packages.

The above-mentioned developments illustrated that using the policy rate to target price stability can have the unintended consequence of allowing the build-up of asset price bubbles and the resultant systemic risk in the financial system, which undermines the financial stability objective. The opposite is also true. Macroprudential policy instruments can also negatively affect price stability as banks' lending rates are a function of the central bank's policy rate (plus a mark-up) as well as of financial regulations imposed on banks to promote financial stability and consumer protection. Higher financial regulation may cause banks' funding costs to rise and these costs may eventually be passed on to customers via higher interest rates on bank products. In addition, more regulation could result

in more stringent credit rationing criteria and therefore limit credit availability to the public.

Instability in the financial system could also result in substantial macroeconomic costs for the real sector, given the interconnectedness between the real sector and the financial sector. Factors that may cause such costs include banking failures, excessive asset-price volatility and distressed market liquidity conditions, which could lead to disruptions in the payment and settlement system. Thus, the recent financial crisis has revealed just how interconnected the financial world has become as shocks in one asset class can have a sizable impact on the stability of institutions, other markets and the real economy on a country level as well as a global level.

Systemic risk arises where a liquidity shortage at a single bank runs the risk of spilling over to other banks in the financial system, thereby causing a run on banks by panicky creditors who withdraw their deposits (or other types of short-term funding) held at these banks. The IMF, FSB and BIS embarked on some work for the G20, and describe systemic risk as a disruption to financial services by impairing all or parts of the financial system and having the potential to lead to serious negative consequences for the real economy. It was expressed that a bank failure, market impairment, a breakdown in market infrastructure or a substantial rise in the cost of financial services could have negative consequences for other market participants.

Borio (2003) and Caruna (2010a) identified two dimensions of systemic risk, namely; a cross-sectional dimension (common exposure) and a time dimension (procyclicality). In the cross-sectional dimension, the way in which the financial system responds to shocks or spillover effects is largely dependent on the structure of the financial system, such as common exposures and interlinkages across institutions. In the time dimension, the build-up of financial risks over time is related to the macroeconomic cycle and policy is centred on how to minimise procyclicality in the financial system.

Procyclicality refers to the tendency of financial variables to fluctuate around a trend during an economic cycle. Increased procyclicality implies fluctuations with broader amplitude (Landau, 2009). For example, during periods of bad economic

times when asset prices are declining and capital conditions are tight, banks are forced to reduce the book values of their assets and to look for additional capital, which will cause them to restrict lending, thereby further worsening the bad times. Conversely, in economic boom times asset prices are typically on an upward positive trend, which results in higher bank credit extension as consumers are in a position to pledge more collateral.

Macroeconomic up- and downturns are thus inherently self-reinforcing. The more pressured banks become in a recession, the less they can afford to lend to companies and households that are dependent on loans. Therefore, it is imperative for banks to build up capital buffers in times of strong economic growth to see them through the bad times.

Despite potential short-term conflicts between the objectives of monetary policy and financial stability, both policies do complement each other and the success of one is highly dependent on the success of the other. According to the Papademos (2009), in the longer run, monetary policy (price stability) and macroprudential policy (financial stability) do not involve any trade-offs. This is largely owing to the fact that, because most financial contracts are concluded in nominal terms, stable prices prevent an unsystematic redistribution of income and wealth between borrowers and lenders that could result from unexpected price developments. Such unsystematic redistribution of income and wealth can lead to defaults.

In this way, effective monetary policy which results in price stability does promote financial stability. The European Central Bank (ECB, 2013a) argues that the opposite is also true. A stable financial system promotes stable monetary policy as it reduces the occurrence of macroeconomic shocks originating in the financial sector.

This was somewhat demonstrated during the recent crisis where the ECB's price stability objective resulted in the firm anchoring of inflation expectations which minimised the risk of deflation, thereby supporting financial stability and steady economic growth in the euro area. There appeared to be a strong interrelationship between price stability and financial stability, particularly when it involved the avoidance of deflation. An effective regulatory infrastructure and sound institutions enhance financial stability which, in turn, contributes towards economic

performance. Hence both price stability and financial stability should form part of a central bank's objective or mandate with each its own set of policies and instruments.

Internationally, substantial progress has been made to improve institutional arrangements with regard to assessing systemic risk in the financial sector. The ECB (2013: p99) points out that macroprudential oversight bodies were introduced in most of the advanced economies, for example, the European Systemic Risk Board in the European Union (EU), the Financial Stability Oversight Committee (FSOC) in the US and the Financial Policy Committee (FPC) in the UK. Many of these countries have also made some progress towards formulating macroprudential toolkits, although a lot of work still lies ahead in identifying primary targets.

In the South African context, the South African Reserve Bank (SARB, 2015b) refers to financial stability as "a financial system which is resilient to systemic shocks, facilitates efficient financial intermediation, and mitigates the macroeconomic costs of disruptions in such a way that confidence in the system is maintained". Thus, financial stability is not an end in itself but, like price stability, is generally regarded as an important precondition for sustainable long-term economic growth and job creation.

The SARB was given a revised mandate by the National Treasury (NT) in October 2010 to assume the responsibility for financial stability. Since then, the NT and the SARB created a joint task team to formulate and implement a macroprudential policy framework for financial stability. In 2013, the NT published a policy document called "Implementing a Twin Peaks Model of Financial Regulation in South Africa" (National Treasury, 2013) and also created the Financial Stability Oversight Committee (FSOC) to support the SARB in its governance role on financial stability.

1.2 PROBLEM STATEMENT

The 2007-2009 global financial crisis highlighted that macroprudential policy and financial stability were the missing ingredients in pre-crisis policy frameworks. Pre-crisis macroeconomic policy frameworks did not target systemic risk. As a result, regulators did not supervise financial systems in their entirety and failed to assess the common exposures of systemically important institutions and identify the build-up of asset price bubbles.

The SARB and other central banks embarked on expanding their mandates to include financial stability and macroprudential policy, and not just price stability. The research problem consists of the fact that macroprudential policy currently presents ground-breaking challenges to central banks, particularly because central banks have very little, if any, practical experience with the various suggested macroprudential policy tools.

1.3 RESEARCH OBJECTIVES

In view of the above research problem, several research objectives present themselves, which will form the basis of this study.

The first objective is to explore the causes of, and key lessons learnt from the 2007-2009 global financial crisis and understand why macroprudential policy and financial stability was the missing pillar in the policy frameworks of central banks.

Secondly, the research intends to investigate the aims and salient features of macroprudential policy as well as explore the nature of systemic risk, which includes how it emerges and its different dimensions.

The third objective is to identify the various macroprudential instruments suggested in the literature and to discuss their likely effectiveness or ineffectiveness with specific reference to their interaction with monetary policy.

By pursuing these three objectives, the study seeks to contribute towards the solution of the research problem as consisting of the challenges posed by the imminent need for central banks to implement macroprudential policies while having very little experience as to the effect on their economies.

1.4. RESEARCH METHODOLOGY

The theoretical foundation of financial stability and macroprudential policy will be explored by means of a qualitative study on the relevant literature. The study will focus on various studies and views (for example, the IMF, BIS, G20, FSB, central bank experiences, and economists), on how they view the effectiveness of macroprudential policy and financial stability in achieving its objectives. Inferences for South Africa will be also be drawn.

In addition, a quantitative analysis using South African data will be done to determine the effectiveness of the credit-GDP gap in (a) detecting the build-up of excessive credit growth and (b) suggesting the point at which banks should build up or release a countercyclical capital buffer, as one of the key macroprudential instruments. A simple version of the one-sided Hodrick-Prescott (HP) filter will be used to determine the trend in the time series of the credit-GDP ratio between Q1 1994 and Q3 2015.

1.5. STUDY SCOPE AND DELIMITATION

Most central banks are still in the process of designing their policy frameworks and macroprudential toolkits. As a result, there is limited empirical evidence on the effectiveness of macroprudential policy tools. In this regard, the author will only be able to draw on existing work done and progress made thus far with regard to policy reform in financial regulation. In addition, this study does not focus in detail on all forms of Basel III regulation and fiscal policy responses by the international community.

1.6 OVERVIEW OF CHAPTERS

Chapter two will present a description of the 2007-2009 global financial crisis and the key causes thereof.

Chapter three will discuss the lessons learnt from the crisis and the objectives and salient features of macroprudential policy to be considered in the design of financial stability frameworks.

Chapter four identifies key macroprudential instruments and surveillance techniques being used by central banks globally in the monitoring of systemic financial risk. The challenges emanating from the interaction between macroprudential policy and monetary policy will also be explored.

Chapter five consists of a quantitative study to establish the deviation of credit from trend, which, according to the Basel Committee for Banking Supervision (BCBS, 2010b), should be used as the main indicator of systemic risk in the banking sector signalling that banks should build up and release countercyclical capital buffers. This chapter also identifies additional early warning indicators of systemic risk used by the SARB and other jurisdictions to identify systemic risk in financial systems.

Chapter six finishes with a summary of conclusions and recommendations for further research.

CHAPTER TWO

THE 2007-2009 GLOBAL FINANCIAL CRISIS – DESCRIPTION AND CAUSES

2.1 INTRODUCTION

Prior to the 2007-2009 global financial crisis, there were weaknesses that were building up in financial systems, largely owing to an extended period of abnormally low interest rates, a loosening in credit conditions and excessive increases in asset prices, low volatility in financial markets, rapid financial innovation and favourable liquidity conditions (Trichet 2009). These sources of financial instability were largely ignored by banks and regulators on a global level.

The IMF (2009b) further argued that during the pre-crisis years of high economic growth, central banks focused too much on price stability, and failed to take into account the build-up of systemic risk associated with the growing macroeconomic imbalances of a rapid rise in house prices and higher levels of leveraging. It became clear that central banks lacked the diagnostic tools, decisive mandates and crisis-management measures to regulate banks and non-banking institutions and that their policies were insufficiently consistent and co-ordinated on a global level.

The following sections describe some of the key shortcomings of monetary policy frameworks adopted in the years prior to the crisis as well as the key causes of the crisis.

2.2 SHORTCOMINGS OF PRE-CRISIS POLICY FRAMEWORKS

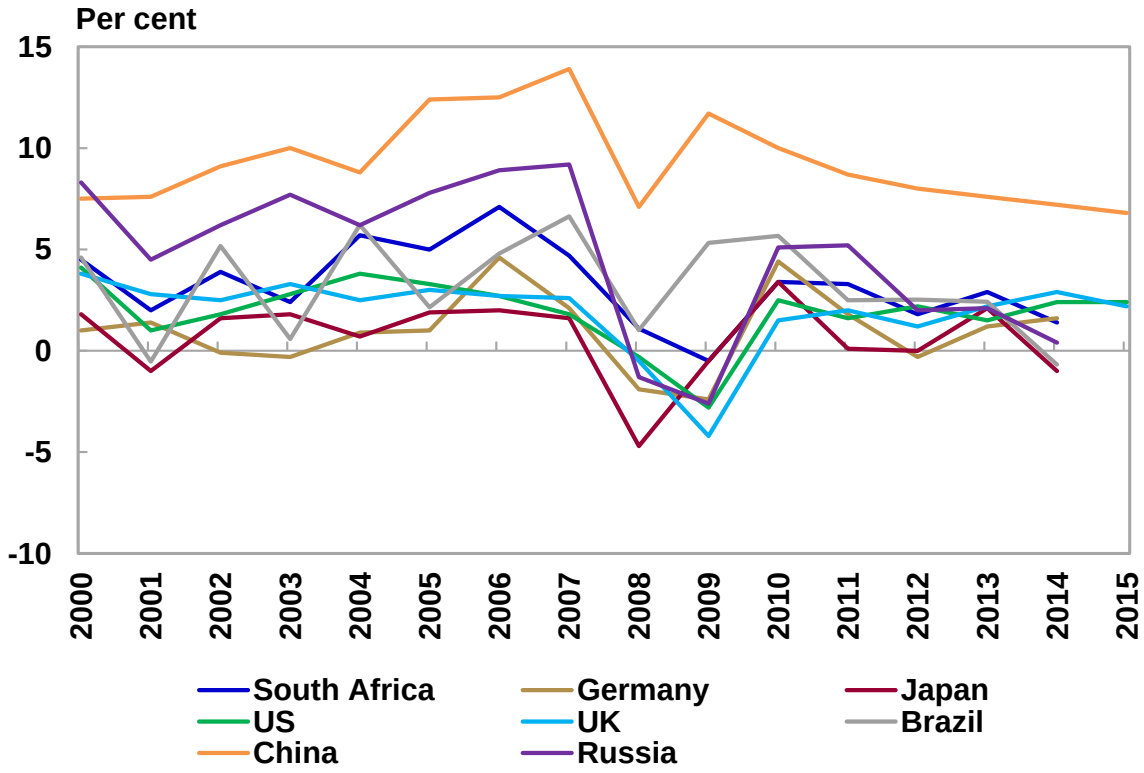
Since the 1970s, most central banks globally adopted monetary policy frameworks where stable and low inflation was seen as the primary and exclusive mandate of central banks (Wellink, 2009). The main instrument used to achieve this objective was the policy interest rate, i.e. the short-term interest rate that a central bank could directly control via appropriate accommodation policies. Since the 1990s, many central banks started adopting inflation targets of around two per cent. The

European Central Bank (ECB), the Bank of Japan (BoJ) and the Bank of England's (BoE) adopted an inflation targeting framework making price stability their main policy objective, while the Fed had a dual mandate to achieve maximum employment and price stability. In its pursuit of price stability, the ECB adopted a two-pillar approach that included an explicit focus on monetary and credit developments.

Financial markets were perceived to be efficient and monetary policy actions were seen as effectively transmitting the policy rate through to longer-term rates, asset prices and inflation expectations. These monetary policy frameworks during the 1990s and early 2000s reflected success in maintaining low and stable inflation and generally well-anchored inflation expectations. Monetary policy was seen as playing an important role in contributing towards an exceptionally long period of stable economic growth (Mishkin, 2011).

After the dot.com bubble burst in 2000 until 2007, growth in some key economies such as the US, China, India and Japan continued to accelerate (Figure 2.1) as monetary policy became accommodative. This was seen as a key contributor to financial instability via the build-up of asset price bubbles due to increased availability of credit amid low interest rates. Policymakers assumed that maintaining low and stable inflation was a sufficient condition for achieving financial stability or minimising financial system instability arising from macroeconomic imbalances (IMF, 2009b).

Figure 2.1 Real GDP growth in key advanced and emerging market economies*



Source: International Monetary Fund, World Economic Outlook Update, January 2016.

*Latest available data

However, despite the relative success that these pre-crisis monetary policy frameworks achieved with stable inflation and high economic growth, monetary policy tended to focus too much on price stability and too little on financial system stability. Financial regulation and supervision were done predominantly from a microprudential perspective, that is, focusing on the solvency of individual firms rather than assessing risks on a macro-financial level through macroprudential supervision (IMF, 2010.)

Furthermore, central banks did not have reliable tools to analyse asset price movements properly and, consequently, could not identify potential risks associated with asset price bubbles which are the main source of financial instability. Thus, systemic risk that emerged from linkages within the financial system and through its interaction with the real economy was not properly understood and financial stability was not incorporated into pre-crisis monetary

policy frameworks. It became clear that financial stability and macroprudential policy needed to be strengthened to ensure proper regulation and supervision of the financial system as a whole (Caruana, 2010b).

2.3 DESCRIPTION OF THE CRISIS

After the bursting of the dotcom bubble in early 2000 and the US September 2001 terrorist attacks, global central banks feared the possibility of a global economic recession and hence responded by reducing their interest rates to stimulate their economies (Truman, 2009). The Fed, for example, lowered its federal funds rate target to 1,75 per cent in January 2002 (the lowest since 1961) and its discount rate to 1,25 per cent (lowest since 1948) (Federal Reserve Bank of San Francisco, 2002), while other central banks followed suite.

Low global interest rates led to the “search for yield”, that is, they encouraged investors to seek higher returns through riskier investments. In addition, mortgage providers also engaged in greater risk-taking by approving subprime mortgage loans to borrowers with impaired or non-existing credit histories confident in the belief that the houses themselves always provide good collateral in case of delinquency. These type of customers did not qualify for prime market rates due to blemished or limited credit history (SARB, 2007). During the pre-crisis years, house prices and commercial property prices in the US and most advanced and emerging market economies began to rise substantially. As these asset prices rose, so did the value of collateral, which provided further impetus to credit demand, resulting in further rises in asset prices and rising leverage ratios of lenders (Justiniano et al. 2014).

The low levels of interest rates also encouraged rapid financial innovations such as complex derivative instruments and structured finance products created through the process of securitisation. Examples of these instruments include collateralised mortgage obligations (CMOs), collateralised debt obligations (CDOs) and credit default swaps (CDS). CMO’s are derived from mortgage backed securities (MBSs) and are issued by a third party that is involved in residential mortgages (Schmidt, 2013). Typically, a CMO issuer would take a

residential mortgage and repackage it as a securitised loan which can be used as collateral for issuing another set of collateralised securities. These new securitised loans are sold to investors. The debt service payments that the issuer of the CMO receives from the residential mortgages are distributed to investors who took up the new securitised loans. In return, the issuer of the CMO receives a fee.

CMOs offer banks the benefit of reduced interest rates, hence lower default risk, largely because the debt is transferred to investors in its repackaged form. With a CMO, an investor has the opportunity to choose how much reinvestment risk he is willing to accommodate in a CMO. CMOs have a high sensitivity to interest rates changes and are therefore subject to repayment risk, which include the risk of default, early repayment and refinancing risks (US Securities and Exchange Commission, 2015).

CDOs (which include auto loans, credit card debt, mortgages or corporate debt) are unregulated repackaged collateralised individual loans that banks sell to investors on the secondary market. The repayments of these loans are the collateral that gives the CDOs value. Similar to CMO's, CDO's are split into different tranches, that is senior, mezzanine and equity tranches, with the senior tranches typically receiving AAA rating while mezzanine tranches usually fetch a rating between AA and BB. When losses are made, it is dealt with in reverse order of seniority, whereby junior tranches would offer higher coupons or interest rates as a way of compensating for default risk.

The key difference between a CMO and CDO is that the cash flow from a CMO comes from a pool of residential mortgages only, while the cash flow from a CDO includes more products such as automobile, credit card loans as well as residential mortgage loans (Schmidt, 2013). This difference explains why the CDO market was more exposed than the CMO market to the bursting of the credit bubble in 2007, due to higher exposure and sensitivity to changes in interest rates for all its products and not just residential mortgages.

Generally speaking, the issuer of the CDO hedges its risk by selling an insurance-like credit protection in the form of a credit default swap (CDS). Both parties on the

hedging transaction become the sellers of credit risk to the investor, with the CDO issuer acting as the intermediary (Gibson, 2007). In addition, both parties (buyer and seller) are permitted to trade their CDS contracts with others. CDS contracts are mostly entered into by banks, hedge funds, and other securitisation institutions that need protection against financial risk or wish to profit on speculation that the underlying CDO would default (Kaminski, 2008).

This type of risk was evident in the most recent crisis, for example, when Bear Sterns reported substantial losses owing to a sharp decline in value of its CDO holdings backed by subprime loans. A similar type of phenomenon was witnessed in the difficulties experienced by Lehman Brothers and AIG who were involved in a large number of CDS transactions.

Prior to the crisis, the size of the CDS market was estimated at about USD45 trillion (SARB, 2007). CDSs are therefore highly sensitive to default risk and insolvency rates. The higher the insolvency rates, the higher the payment obligations under the CDS contracts. Jarrow (2011) argued that these structured finance instruments were a major contributing factor to the global financial crisis.

The Group of Thirty (G30, 2015) identified four critical stages of the 2007 global financial crisis. The first stage of the crisis was in 2005, when US house prices began to decline rapidly, with an almost simultaneous increase in delinquency rates on subprime mortgages. During this phase, the Fed had already started raising interest rates in the US. From 2004 to 2006 US interest rates rose from 1,0 per cent to 5,35 per cent, which resulted in falling house prices. Sub-prime borrowers, in particular, took strain in repaying their mortgage loans while investors also suffered losses, making them reluctant to take on more CDOs. In early 2007, the US officially announced the sharpest declines in house prices since the 1930s. This led to widespread fears of losses on subprime loans and securitisation products, as collateral values started to fall below the loan values.

The second stage of the crisis was characterised by a widening in credit spreads on unregulated securitisation products. Credit spreads represent a difference in

yield between two bonds that characterise a similar maturity but have different credit quality, that is, the difference between the quoted rates of return on two different investments of credit quality.

In February 2007 the Federal Home Loan Mortgage Corporation (Freddie Mac) announced that it would no longer purchase the most risky subprime mortgages and mortgage-related securities. A few months later in April 2007, leading subprime mortgage lender, New Century Financial Corporation, filed for bankruptcy protection. Standard and Poor's and Moody's subsequently downgraded more than 100 bonds backed by second-lien subprime mortgages in June 2007. In July 2007, Standard and Poor's placed 612 securities backed by subprime residential mortgages on a credit watch. In July 2007, Bear Stearns liquidated two hedge funds that invested in several types of MBSs.[1]

Conditions deteriorated further in August 2007 after quite a few European investment funds suspended redemptions of liabilities as there was uncertainty around how to accurately value these funds. It was at this point in time that the market for securitised products and commercial paper began to collapse and financial markets began to panic. In September 2007, panic heightened after United Kingdom (UK) bank Northern Rock needed an emergency bailout from the BoE in its capacity as "lender of last resort". This incident triggered the first run on a bank for more than a century. Northern Rock was nationalised for a temporary period.

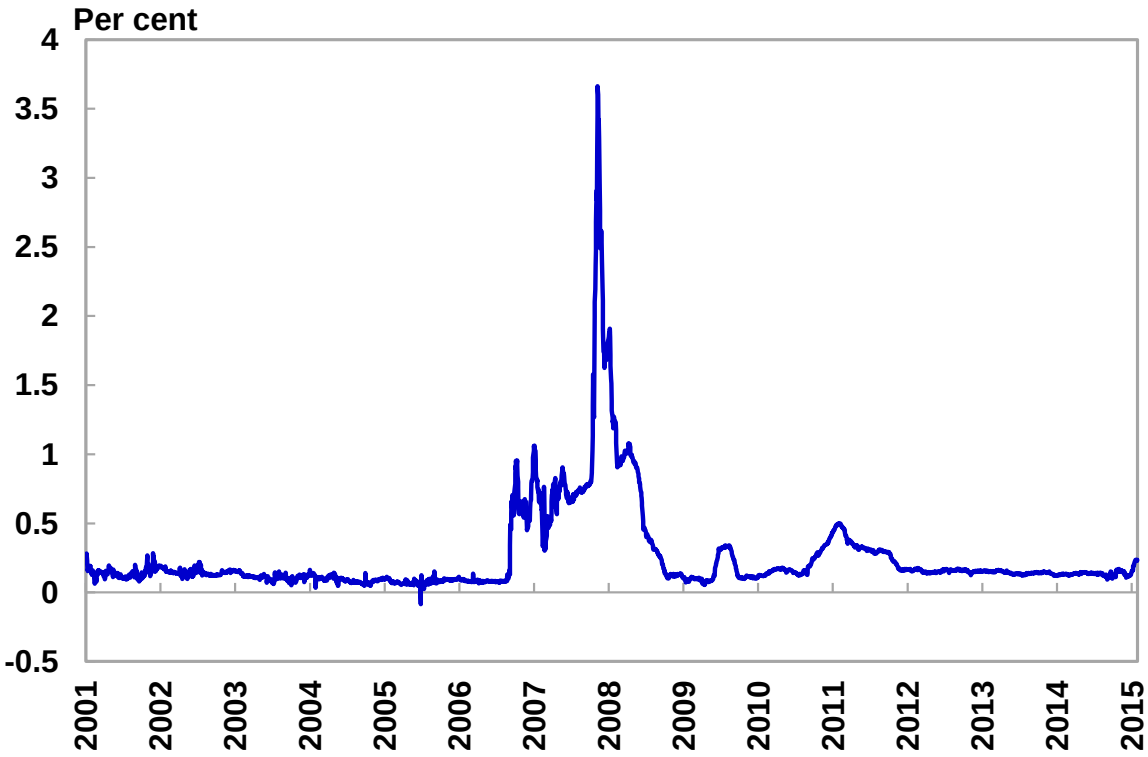
Meanwhile, in September 2008, US authorities had to bail out the country's two largest mortgage lenders, Fannie Mae and Freddie Mac, who were owners/guarantors of USD5 trillion worth of home loans. The US Treasury Department purchased about USD100 billion in their preferred stock and MBSs, resulting in both organisations being placed in conservatorship by the Federal Housing Finance Agency. In total, it cost around USD187 billion over time to keep both organisations alive. This bailout qualified as the largest ever in the US.

Timeline of the 2007 global financial crisis was accessed on the website of the St Louis Federal Reserve Bank and the Telegraph.

US investment bank Bear Stearns also experienced financial difficulties and had to be merged with JPMorgan Chase, while Merrill Lynch was taken over by the Bank of America.

Banks became reluctant to lend to each other on fear of counterparty risks which resulted in a spike in interest rate spreads on commercial paper and commercial bonds over government bonds (especially for institutions with lower credit ratings), a shortening of maturities as well as wide-spread losses across most asset classes (Juhara, 2009).

Figure 2.2 **The LIBOR-OIS spread during the 2007-2009 global financial crisis**



Source: International Monetary Fund database[2]

Interbank lending in most markets of major currencies froze causing severe liquidity problems throughout the US banking system. Money-market rates rose sharply, reflected in the widening spread between the 3-month London Interbank Rate (LIBOR) and the 3-month Overnight Index Swap (OIS) (Figure 2.2). The OIS

[2] Data can be accessed from http://data.imf.org

measures market expectations of the US federal funds rate over the 3-month period comparable to 3-month LIBOR. The spread between OIS and LIBOR measures factors other than interest rate expectations, such as counterparty risk and liquidity effects (Taylor, 2008). The spike in the spread was an indication of heightened counterparty risks and liquidity squeezes in interbank markets in the US.

The spread remained high for the next few months and central banks and international organisations had to come up with co-ordinated measures to stabilise markets and ensure financial stability. These measures will be discussed in section below on policy responses to the crisis.

The third stage of the crisis started in September 2008. In the preceding months, European markets particularly in the UK experienced high levels of volatility as banks ceased lending to each other due to panic over their exposure to US sub-prime mortgages and structured finance packages. A number of European banks which were dependent on US money market mutual funds for the continual roll-over of their short-term dollar funding, faced further liquidity problems and were consequently forced to sell their assets at fire-sale prices[3]. The credit crunch and liquidity crisis thus spread to Europe.

Market conditions intensified after Lehman Brothers failed in September 2008, followed by a number of other large banks in the US, UK and eurozone, which also required government bail-outs. These developments triggered concerns that the fundamental issue could be one of solvency instead of liquidity.[4] The Lehman Brothers failure was deemed a solvency crisis as the institution's debt obligations exceeded its portfolio of assets. The organisation became insolvent despite a temporary bailout from the Fed. It was proven that even if a financial institution did have access to liquidity lines from a central bank, it did not necessarily imply that

[3] Fire-sale prices are discounted prices (much lower than the fair market value) at which insolvent or bankrupt organisations liquidate their assets in order to achieve a rapid sale to avert a financial crisis or to pay off debt.

[4] A liquidity crisis occurs when there is insufficient immediate funding but liabilities can still be met with asset sales. However, a solvency crisis means a country or firm cannot meet its debt obligations even through the sale of assets, which is deemed more serious.

liquidity assistance could prevent solvency problems in the longer run (Pettinger, 2012).

Financial markets in advanced economies began suffering even more substantive losses on fears of a solvency crisis as well contagion effects. There was heightened risk aversion as money markets collapsed, equity prices plummeted and credit spreads spiked. The banking system was in need of additional government-provided equity to absorb losses due to further credit write-downs as conditions deteriorated (IMF, 2009c).

The fourth stage of the crisis began in late 2008 when there were spillover effects from financial markets in advanced economies to the real sector (G30, 2015) and (Mohanty, 2009). Banks began experiencing problems in accessing capital, with tighter credit conditions leading to slower demand for credit and hence slower private sector credit growth and lower spending. During that period, the IMF (2009c) estimated that US and European private sector credit could contract by 4,0 per cent (quarter-on-quarter annualised) and there would be further deleveraging by banks in the form of sale of assets to public sector entities or to nonbanks, and the maturing of other assets. Many advanced economies (such as US, eurozone, UK, Canada, Japan, Australia and New Zealand) had fallen into economic recession and faced deteriorating conditions in 2009. Real GDP growth in advanced economies slowed from 2,7 per cent in 2007 to 0,2 per cent in 2008 before contracting by 3,4 per cent in 2009.

Although banking systems in emerging markets had limited exposure to sub-prime loans and securitisation products in the US and Europe, economic activity in emerging markets slowed markedly as the crisis spread from the US to emerging markets through financial and trade linkages. The economic recession in the US resulted in declining US imports from its major trading partners. The resulting decline in export sales led to slower growth in emerging markets. In 2009, emerging market GDP growth slowed sharply and fell to 2,8 per cent (from 6,1 per cent in 2008). Consequently, there was also a reversal in capital flows. After reaching a peak of 5,0 per cent of GDP in 2007, net private flows to emerging

markets slowed sharply in 2008 and 2009 (IMF, 2009c) and currencies were also negatively affected.

Between the end of 2008 and 2010, there were also other key developments across the US and Europe that exacerbated conditions in the global financial system. To name a few, in October 2008, the Icelandic government nationalised the country's second largest bank, Landsbanki, as well as the third-largest bank, Glitnir, after both institutions experienced short-term funding problems because they had financed themselves through repurchase agreements (repos) on the US money market and these repos could not be rolled over when the US money market was suspended. A month later, the IMF approved a USD2,1 billion loan to support Iceland's banking sector.

In October 2008, the UK government announced a £37 billion rescue package for Royal Bank of Scotland, Lloyds TSB and Halifax Bank of Scotland. In January 2009, the Irish government announced its nationalisation of Anglo Irish Bank. Meanwhile, the US government injected another USD20 billion into the Bank of America from its USD700 billion financial rescue fund to assist with losses incurred when it purchased Merrill Lynch. In February 2009, Ireland announced that it would inject €7 billion into Bank of Ireland and Allied Irish Bank in return for guarantees on lending, executive pay and mortgage arrears. The government received a 25 per cent indirect stake in both banks. Conditions took a turn for the worse in May 2010, after Greece received bailout funds worth €110 billion (£93 billion) from eurozone countries and the IMF. Later that year, Irish Finance Minister Brian Lenihan recommended that government formally request a bailout package from the European Union (EU), ECB and IMF.

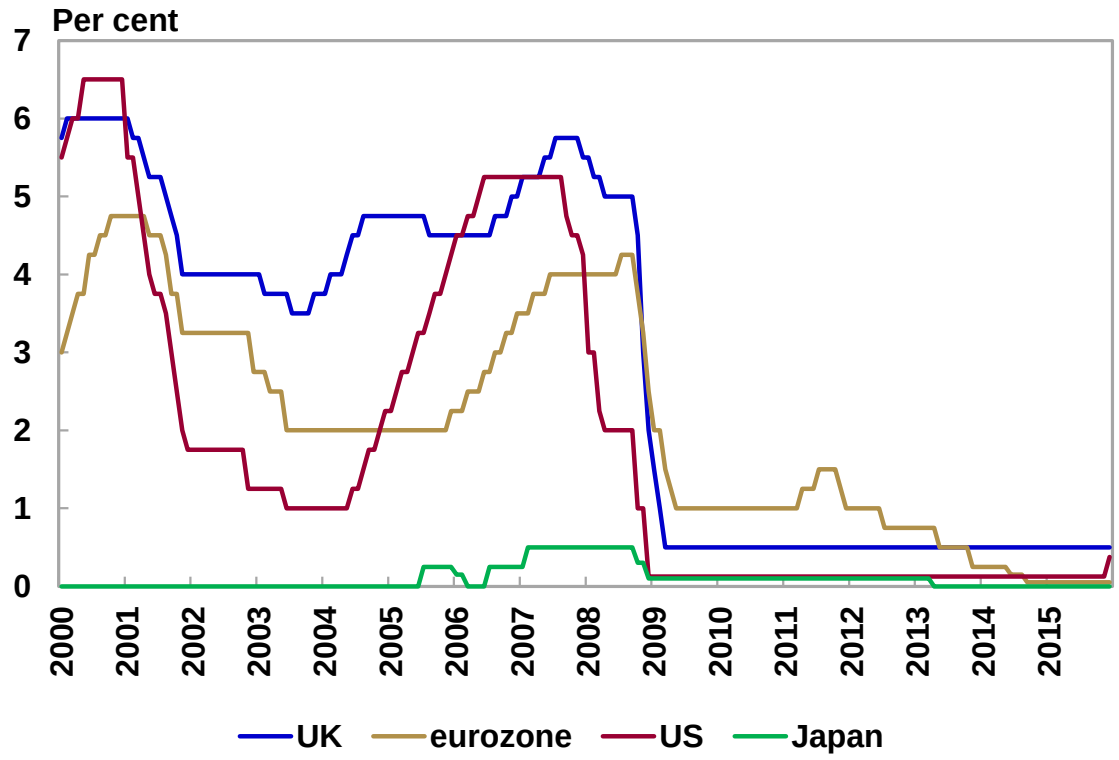
2.4 POLICY RESPONSES TO THE CRISIS

In light of the troubles and bankruptcies experienced by banks, various measures were taken by policymakers to support financial stability in the global financial system.

2.4.1 Interest rate reductions by the major central banks

The Fed began implementing aggressive policy measures in response to the crisis. After reducing the discount rate in August 2007 (that is, the rate at which the Fed lends to depository institutions), the Fed began its monetary policy easing phase in September 2007 (see Figure 2.3), reducing the target for the federal funds rate by a cumulative 325 basis points by the spring of 2008 to support employment and income growth as well as price stability (Bernanke, 2009c). However, economic conditions in the US deteriorated, forcing the Fed to reduce the target federal funds rate by an additional 100 basis points until the end of October 2008.

Figure 2.3 Policy rates of major central banks



Source: International Monetary Fund[5]

[5] Data can be accessed from http://data.imf.org

On 8 October 2008, in an unprecedented move, six central banks (Fed, ECB, BoE, Bank of Canada, Riksbank, Swiss National Bank) took co-ordinated action to reduce their respective policy rates. A few months later in December 2008, the Federal Open Market Committee (FOMC) of the Fed further implemented a zero lower bound by reducing its target for the federal funds rate close to zero and setting a range of 0 to 25 basis points. On 16 December 2015, the Fed increased the federal funds rate target by 25 basis points to a range of 0,25 per cent to 0,50 per cent, on improving economic and inflation prospects.

By early 2008, all the major central banks had begun reducing their policy rates, with the exception of the ECB, which was still concerned about rising inflation. Prior to the crisis, the ECB had raised its policy rate and on improving growth prospects and expectations of higher inflation did so again in 2011. However, these moves were short-lived as the Greek crisis and the wider eurozone crisis threatened financial stability in the region. The ECB embarked on monetary policy easing in March 2014 by introducing a negative (penalty) interest rate on reserves held by commercial banks with the central banks in the euro system, in a move to encourage more commercial bank lending and to limit the appreciation of the euro (G30, 2015). Elsewhere in Europe, the BoE reduced its base lending rate by 50 basis points on 8 October 2008 in a global-coordinated move with the FOMC, ECB and other major central banks.

The BoJ undertook policy action from September 2008 by reducing policy rates twice and also adjusting its monetary policy framework to ensure financial stability in markets. (Vollmer and Bebenroth, 2012). Furthermore, to improve liquidity conditions and ease the pressure of short-term rates in the US money market after the failure of Lehman Brothers in September 2008, the BoJ signed a bilateral currency liquidity agreement or swap facility with the US Fed, permitting the BoJ to access US Dollars from the Fed and lend US dollars to domestic banks.

Other measures from the BoJ included lowering the target rate for the uncollateralised overnight call rate twice by 20 basis points to 0,3 per cent on 31 October 2008 and to 0,1 per cent on 19 December 2008. The basic loan rate and the basic discount rate were also lowered to 0,3 per cent and 0,1 per cent, on the

respective dates. In addition, the BoJ introduced a complementary deposit facility, whereby the interest rate paid by BoJ was fixed at 0,1 per cent, permitting domestic banks to receive interest payments on excess balances with the BoJ. These measures were intended to improve liquidity conditions in Japan and prevent the uncollateralised overnight call rate from falling significantly below the target rate (Vollmer and Bebenroth, 2012).

2.4.2 Forward guidance

Generally speaking, central banks were increasingly becoming more transparent on the future course of monetary policy, particularly after the adoption of zero lower bound interest rates in response to the crisis. This phenomenon is known as forward guidance and has been adopted by four major central banks, with the objective of enhancing the effectiveness of monetary policy at the zero lower bound.

Cœuré (2013) defines forward guidance as explicit statements by a central bank on the likely path of future policy rates. In other words, a central bank would use forward guidance to influence interest rates by trying to influence the financial decisions of consumers, businesses and investors. Forward guidance requires transparency and commitment from a central bank that it will deliver on its guidance on future monetary policy to prevent surprise decisions that might have a disruptive effect on markets causing them to become volatile.

The central bank's intention with forward guidance is to influence investors to increase their investments at present to achieve higher returns in the future, by convincing markets that it will adopt a low-interest policy now to foster a faster economic recovery in the future (The Economist, 2014). Since the onset of the most recent financial crisis, the US Fed, ECB, BoE and BoJ have adopted forward guidance, with the aim of enhancing the effectiveness of monetary policy at the zero lower bound (BIS, 2014a).

The Fed first introduced forward guidance in 2003-2004, after it reduced its policy rate to its record low level of 1,0 per cent in June 2003. In its policy statement in

August 2003, the Fed indicated its intention to keep interest rates low for an extended period of time to support economic growth and influence longer-term Treasury yields (Shirai, 2013).

Since December 2008, at the peak of the recent crisis, when the US Fed reduced its policy rate to its lower bound, it started to adopt forward guidance again by using a few verbal expressions to convince investors that its policy rate would remain low for longer. For example, the US Fed has used terminology such as “patient,” “considerable time” and “extended period,” to provide guidance to investors on just how long it is likely to keep policy rates at low levels. In certain instances, the US Fed even went so far as to provide dates and economic variables (such as unemployment rates and inflation projections) which would cause the Fed to change its stance (Da Costa, 2015). In 2011, the US Fed moved towards a calendar-based forward guidance by stating that disappointing economic conditions would justify that interest rates would remain low for at least the following two years.

From December 2012, the Fed shifted to threshold-based forward guidance, advocating that an adjustment in its policy rate would be considered once there was evidence that the US unemployment rate would decrease to less than 6,5 per cent and inflation would increase above the inflation target of 2,0 per cent (BIS, 2014). Consequently, the US Fed did raise its federal funds rate in December 2015 (for the first time since 2006) by 25 basis points to a target range of 0,25 per cent to 0,50 per cent (from the previous target of 0 per cent to 0,25 per cent). This was as a result of a strong improvement in labour market growth, which resulted in the unemployment rate declining below 6,5 per cent (Appelbaum, 2015). Despite the US inflation rate not increasing above the 2,0 per cent target in December 2015, the US Fed decided to raise its policy rate anyway as the generally strong economic data in 2015 convinced them that inflation would rise about the US Fed’s target in the near future.

The ECB adopted forward guidance in July 2013 when it stated that policy rates would remain at present levels or even be lowered for an extended period of time (ECB, 2013c). This practice differed from previous communiques from the ECB,

which never commented on monetary policy expectations beyond the following meeting. In November 2013, the ECB reduced its policy rate and thereafter reiterated its view that future policy decisions would depend on the outlook for inflation, taking into consideration the economic performance of the region.

The BoE adopted threshold-based forward guidance in the middle of 2013, by commenting that its prevailing low interest rate would be linked to a quantitative threshold for the UK's unemployment rate (greater than 7,0 per cent). This quantitative threshold was linked to three other "knock-out" criteria, which included a quantitative threshold for an 18 to 24 month view of inflation projections (less than 2,5 per cent), anchored medium-term inflation expectations and the absence of financial instability risks (BIS, 2014). If any of these criteria were not met, the BoE would discontinue forward guidance.

The BoJ first introduced forward guidance in 1999-2000, two months after its adoption of the zero interest rate policy. At that stage the BoJ linked the continuation of its zero interest rate policy to prevailing deflationary concerns. In other words, the longer deflation persisted, the more likely the BoJ would maintain its zero interest rate policy stance. The BoJ's second round of forward guidance was done between 2001 to 2006, after QE was implemented in March 2001 and the policy rate was reduced to an average of around 0,15 per cent (Shirai, 2013). At that stage, the BoJ changed the main operating target for money market operations from the uncollateralised overnight call rate to the reserve balances held by domestic banks at the BoJ. In doing so, the BoJ adopted a state-contingent guidance, that is, it linked the zero interest rate policy to QE.

In October 2003, the BoJ provided more clarification about its state-contingence guidance, stating that the core inflation rate should be zero per cent or higher and, if achieved, its QE policy would be terminated. After core inflation rose to register a positive reading in November 2005, as promised, the BoJ terminated the QE programme in March 2006 by reintroducing the uncollateralised overnight call rate as a money market operations operating target.

The BoJ introduced its third round of forward guidance in October 2010 by adopting a threshold-based forward guidance linked to the inflation rate in the context of its Comprehensive Monetary Easing programme. Its zero interest rate policy would remain intact until the BoJ's price stability goal was achieved and no further significant risks in the financial system emerged. In April 2013, the BoJ implemented the Quantitative and Qualitative Easing programme, which had characteristics of both threshold- and calendar-based forward guidance. This did not include explicit forward guidance on the policy rate (BIS, 2014). At this time, the BoJ replaced the uncollateralised overnight rate with the monetary base as its operating target of money market operations. These changes were implemented with the objective of achieving a 2,0 per cent price stability target within a time period of two years via large-scale asset purchases and monetary base expansion.

2.4.3 Unconventional measures (capital injections, quantitative easing and balance sheet management

Despite the many interventions by the major central banks to reduce policy rates to stimulate economic growth and ease liquidity strains in money markets, central banks were somewhat unsuccessful as consumers were still experiencing debt overhang and economies were still plagued by high levels of unemployment, low growth and lack of fiscal reform. As a result, the major central banks began implementing QE (Gallo, 2015).

QE is an unconventional monetary policy tool that is traditionally used by a central bank when short-term interest rates are close to or at zero and scope for fiscal stimulation has run out. Essentially, a central bank moves from targeting interest rates to targeting the amount of excess reserves held by banks. Central banks purchase financial assets in exchange for reserves. Hence, the level of purchases, not the interest rate becomes the policy target instrument of the central bank (Fawley and Juvenal, 2012). Central banks buy government securities or other securities from the market, with the objective of lowering long-term interest rates and increasing the cash reserves of banks and ultimately the money supply.

A typical feature of QE is also that central banks start paying interest on banks' excess cash reserves at a rate equivalent to their policy rate. In that way, the interest rate is prevented from being driven down to zero by the superabundance of cash reserves (assuming the policy rate is still above zero per cent). When the central bank buys assets from banks, only the cash reserves of banks and not the money stock increases. But when the central bank buys assets from non-banks (pension funds, etc) both the cash reserves of banks and the money stock increases.

US Fed

The Fed began the first round of QE (QE1) in November 2008 by proposing to purchase USD100 billion of agency debt and USD500 billion of mortgage-backed securities. In March 2009, the Fed purchased another USD850 billion of mortgage-backed securities and debt as well as USD300 billion of longer-dated Treasuries (Forbes.com, 2015). In addition to adding cash reserves to the banking system, the intention of QE1 was also to remove toxic assets from the financial system.

The Fed implemented the second round (QE2) in November 2010 by announcing its intention to purchase USD600 billion worth of US Treasuries over a period of eight months (effective in the middle of 2011) at about USD75 billion of Treasuries per month. The Treasuries being purchased were longer-dated (mostly five- and 10-year) maturities as the Fed sought to lower long-term interest rates in particular as these were regarded as the rates which had the greatest influence on lending (Hennessey, 2011). A few months later in September 2011, the Fed introduced a new maturity extension programme, known as Operation Twist, with the objective of increasing the average maturity of its Treasury portfolio. In this regard, the Fed bought USD400 billion of Treasuries with between 72 and 360 months maturities, and sold an equal amount of Treasuries between 3 and 36 month maturities, again with the objective of lowering long-term yields.

In September 2012, the Fed announced QE3, purchasing about USD40 billion per month in mortgage-backed securities. Combined with Operation Twist, the

Fed would purchase USD85 billion worth of long-term bonds. In December 2013, the Fed hinted at the possibly tapering off of QE, by reducing purchases of securities by USD10 billion per month. Eventually in October 2014, the Fed announced that its QE3 programme had ended.

Since the end of 2007, the Fed also implemented a number of unconventional measures in the form of new credit facilities. In December 2007, the Fed introduced the Term Auction Facility (TAF) to allow US banks to have more access to credit at the Fed's discount window. Banks were allowed to bid for funds at auctions held every two weeks for either 28 days or 84 days (Litan, 2011). In March 2008, the Fed decided to introduce another two credit facilities named the "Term Securities Lending Facility" (TSLF) and the "Primary Dealer Credit Facility" (PDCF) to eligible primary dealers that were not classified as banks. Under these programmes, primary dealers were allowed to borrow funds at the discount window on the full range of collateral permitted by the Fed. A few months later, in May 2008, the Fed again embarked on extending the TSLF to accept high-rated asset backed securities (ABSs) as collateral (Friedman and Kuttner, 2011), while in October that year it introduced more credit facility measures by way of a "Commercial Paper Funding Facility" and a "Money Market Investor Funding Facility."

European Central Bank

From October 2008, the ECB implemented non-standard measures to support bank liquidity and funding in the eurozone. These measures included fixed-rate full allotments, the extension of supplementary liquidity provision at longer maturities, and currency swap agreements (Cour-Thimann and Winkle 2013). The fixed-rate full allotments were complemented by the 6-month and 12-month operations and were applicable to all refinancing operations, such as the main refinancing operations and long-term refinancing operations, providing eligible banks with unlimited access to liquidity at the ECB at the refinancing rate. These measures were intended to reduce funding risk of banks.

The ECB extended the maturity of its supplementary liquidity provisions of longer term reverse repos to banks by 12 months in June 2009 to enable banks to refinance a larger portion of their balance sheets. The ECB also had liquidity-providing currency swap agreements put in place in the initial stages of the crisis with the Fed to permit the provision of US dollars to counterparties in the Eurosystem whose banks has borrowed heavily in the US money market and could not roll over their short-term debt. Liquidity-providing swap lines between central banks were intended to prevent the widespread failure of European banks with large dollar debts and so to limit negative spillover effects to the real economy in the eurozone (ECB, 2013).

The ECB conducted a limited amount of currency swaps with the Fed at the end of the end of 2007, when markets were beginning to experience liquidity strains. The amount of currency swaps done between both jurisdictions was increased substantially after the failure of Lehman Brothers in September 2008, while the ECB also conducted a swap agreement with the Swiss National Bank (SNB) to provide Swiss francs to Eurosystem counterparties which could not roll over their Swiss franc debt. In 2011, the ECB was one of the major banks in conjunction with the US Fed, BoE, BoJ, SNB and Bank of Canada (BoC) that introduced bilateral swap lines to allow each jurisdiction to provide foreign currency to domestic counterparties, if required.

The ECB introduced more unconventional measures at the time of the European sovereign debt crisis in 2010, where there were expectations that Greece could default on its debt obligations which would have spillover effects to other peripheral countries in the region such as Ireland, Italy, Portugal and Spain as well as affect economic growth in the core European economies and overall growth in the region. The ECB established its Securities Market Programme (SMP) in May 2010 and Covered Bonds Purchase Programme (CBPP) which was put in place to purchase government bonds and covered bank bonds from eurozone countries that were experiencing liquidity problems (Claeys, 2014).

Under the SMP, the ECB purchased about €220 billion of Greek, Irish, Portuguese, Italian and Spanish government bonds. In 2010, the ECB bought its

first round of covered bonds of €60 billion, while a year later in November 2011, it adopted the second round worth about €40 billion. Finally, the ECB introduced the Outright Monetary Transactions Programme, whereby it could buy unlimited amounts of government bonds from members states. So far, the ECB has not deemed it necessary to use this measure (González-Páramo, JM. 2012).

Bank of England

In March 2009, the BoE first announced its intention to adopt QE to boost lending to firms and households. The first round of QE was actually done in January 2010 and consisted of £200 billion of purchases, largely medium- and long-term government securities (gilts) from the non-bank private sector. The second round of QE (QE2) was done between October 2011 and June 2012, whereby the BoE bought £175 billion of gilts on fears that the eurozone sovereign debt crisis might spillover to the UK and cause UK CPI to fall below its 2,0 per cent target (Churm et al., 2015). This took the total amount of QE in the UK to £375 billion, where it has remained into 2016.

Bank of Japan

The BoJ first implemented QE in 2001 in an attempt to boost economic growth and effectively prop up prices, due to long periods of deflation in the years prior to that. The first round of QE lasted for five years and was deemed unsuccessful as Japan continued to suffer from deflation (Allen, 2015).

During the crisis, Japanese banks experienced small losses compared to their US and European counterparts, owing to limited exposure to subprime and securitisation products in these regions. However, the Japanese economy suffered greater losses than the two regions, largely due to substantial declines in the nation's exports. Quarterly real GDP decreased by 3,0 per cent (11,6 per cent at an annual rate) and 4,8 per cent (18,0 per cent) in the third and the fourth quarters of 2008, respectively (Litan, 2011). Subsequently, the Japanese yen

registered a sharp appreciation against the USD and the Japanese equity market collapsed, largely owing to large declines in the share prices of export companies.

In response to the crisis, the BoJ introduced a number of measures. In October 2008, the BoJ made a decision to suspend the purchase of equities from banks on the stock exchange, but purchases resumed in February 2009. These temporary measures were intended to stabilise the equity market as well as to mitigate market risk associated with stockholding.

In 2008, the BoJ expanded its Securities Lending Facility (SLF), permitting it to sell Japanese Government Bonds (JGBs) with repurchase Agreements, while also reducing the minimum fee rate from 1,0 to 0,5 per cent. The objective of the SLF was to inject liquidity into financial markets. Soon thereafter, the BoJ embarked on the expansion of the SLF by the introduction of floating-rate JGBs, inflation-indexed JGBs and 30-year government bonds for eligible banks to the list of the eligible collateral for its repo operations. The market was suffering from a lack of liquidity and these measures were intended to add more liquidity and further enhance financial stability. In this regard, the BoJ reduced the minimum fee rates for the SLF from 1,0 per cent to 0,5 per cent (Vollmer and Bebenroth, 2012).

In December 2009, the BoJ decided to reinstate its QE policy (that is, its outright purchases of JGBs) from early 2000, as there was little room to manoeuver, given that its policy interest rate (the uncollateralised overnight call rate) was already close to the lower zero bound at 0,1 per cent. The BoJ expanded the range of JGBs accepted in these outright purchases to include floating-rate JGBs, inflation-indexed JGBs and 30-years government bonds. In January 2009, the BoJ also announced outright purchases of corporate bonds to boost liquidity and support the corporate financing market. The outright purchase of both CP and corporate bonds expired at the end of 2009.

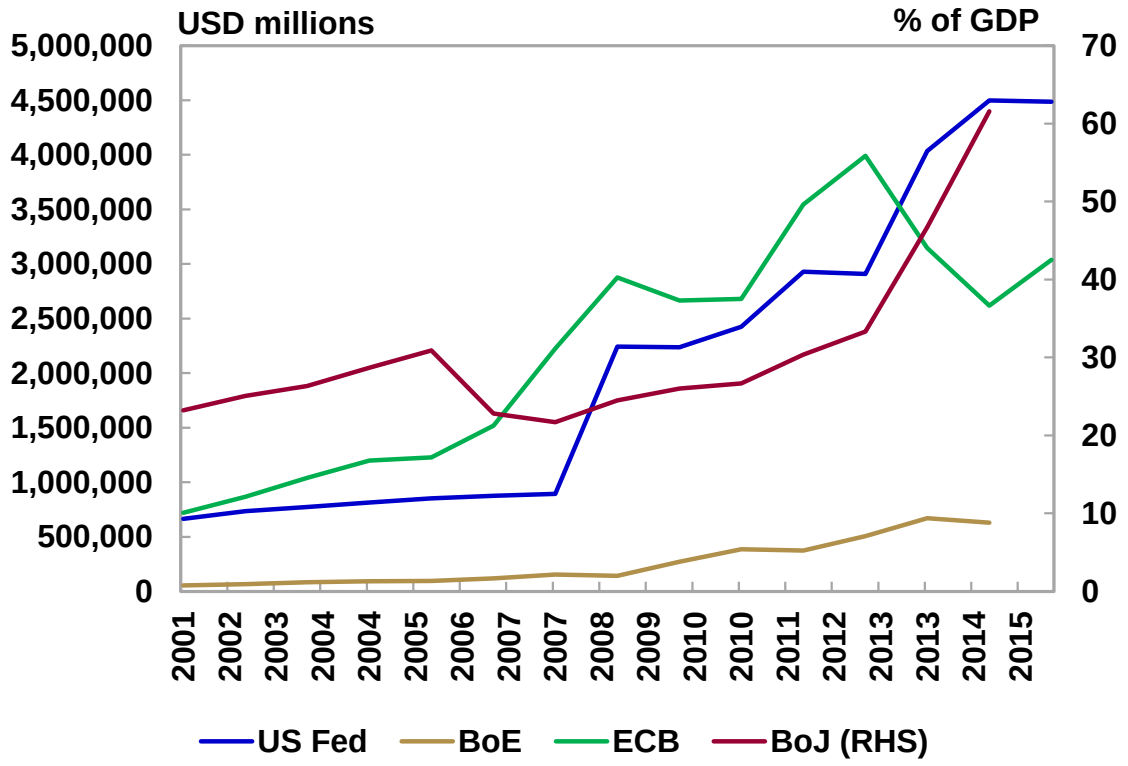
In the aftermath of the crisis (April 2013), the BoJ announced a massive QE programme worth USD1,44 trillion, where there was a commitment to purchase ¥7 trillion of government bonds each month. However, the country could still not break the deflationary spiral in which it was caught and embarked on more QE

purchases of mainly JGBs in October 2014 by increasing them to ¥80 trillion a year, from ¥60 - ¥70 trillion a year previously (Allen, 2015).

The implementation of QE since most recent crisis has led to a sharp expansion in the size and composition of balance sheets of the central banks in the major advanced economies (Figure 2.4). With the exception of the BoJ which was already building up a large balance sheet since 2001, the Fed, ECB and BoE experienced sizeable expansions in their respective balance sheets since the second half of 2009[6].

The US Fed's holdings of securities ballooned from USD850 billion in mid-2007 to around USD 4,0 trillion at the end of 2013, while the other major central banks also expanded their balance sheets quite considerably.

Figure 2.4 Central Bank Balance Sheets – Total Assets (USD)[7]



Source: International Monetary Fund database[8]

[6] Japan's unconventional monetary policy began in March 2001, after the economy experienced deflation of around 1,0 per cent.

Latest available data. Japan's balance sheet is shown as a percentage of GDP on the right hand scale

The crisis response measures undertaken by the major central banks highlight the important role that central banks play in containing financial crises and mitigating their effects on the real economy. However, central banks were singularly unsuccessful in reading the signs and taking timely steps to prevent it from happening in the disastrous way that it did, which is what macroprudential supervision is all about. It is critical that, when trying to come up with policy frameworks to mitigate systemic risk in the financial system and prevent outright crisis, policymakers have a clear understanding of the underlying causes of crises. The next section deals with the main causes of the 2007-2009 global financial crisis.

2.5 MAIN CAUSES OF THE CRISIS

2.5.1 Long periods of low interest rates

It has often been argued that low inflation and excessive expansionary monetary policy was responsible for the global financial crisis. Taylor (2007) strongly believed that the US Fed had set the policy rate below the correct level, resulting in excessively low interest rates and borrowing costs and led to overleveraging by banks in the search for higher returns. Bernanke (2005a), however, disagreed with this view, stating that US interest rates were not excessively low and that it was in fact, global imbalances that led to lower interest rates globally.

The bursting of the dot-com bubble in the US in March 2000 contributed towards the start of the Fed's adoption of low interest rate policy. The dot-com bubble emanated from a sharp rise in asset (equity) prices which was fuelled by excessively high levels of investment in internet-based companies in 1995. Investors had channelled large amounts of funds into internet start-up companies in the hope that these companies would one day generate super profits (Wellink, 2009). These companies came to be known as "dot-coms," after the ".com" in many web addresses.

[8] Data can be accessed from http://data.imf.org

Between the period 1995 and 2000, the value of equity markets grew substantially, with the technology-dominated Nasdaq index increasing from under 1 000 index points in 1995 to about 5 000 index points in 2000. The market capitalisation of the Nasdaq stock exchange was about USD6,7 trillion, which was in bubble territory (Geier, 2015). The dot-com bubble burst within that year, with sharp declines experienced in equity prices and resultant declines in business spending and consumer confidence, which in turn led to the failure of many dot-com and technology companies.

Economic conditions deteriorated further after there was an increase in outsourcing of projects that resulted in high unemployment among computer developers and programmers. Thereafter, the US economy suffered a further major setback in the wake of the terrorist attacks in 2001. As a result of the above-mentioned developments, the Fed implemented aggressive easing of monetary policy to avoid a deep economic recession, reducing its policy rate to one per cent in June 2003, a cumulative reduction of 550 basis points between 2001 and 2003. Interest rates remained low for the next year with other central banks such as the ECB and the BoE following suit.

During this period of low interest rates, there was increased demand for credit, which led to higher consumption and investment as well as to the build-up of asset price bubbles, particularly of property. In addition, there was a flood of investment mostly into US government securities from countries such as Japan and China which sought higher returns in a relatively risky environment. According to Bernanke (2009a), the net inflow of foreign saving to the US increased substantially from 1,5 per cent of GDP in 1995 to around 6,0 per cent in 2006. These high levels of foreign savings in the US helped keep US mortgage interest rates low and bank lending standards were very relaxed.

Eventually, investors began taking more risks by investing in US mortgage-backed securities (MBSs) which offered higher returns on seemingly low-risk assets and were highly recommended (AAA ratings) by the major rating agencies (Moody's, Standard & Poor's and Fitch). Borio and Disyatat (2011), in contrast, argue that there is no evident correlation between the global savings rate and real interest

rates. Their study indicated that irrespective of the trends in the global savings, real long-term interest rates continued to decline since the 1990s, as also noted by Taylor (2007).

Holt (2009) argued that low short-term US interest rates due to a low interest-rate policy by the Fed were largely responsible for the build-up of the US property bubble in two critical ways. Firstly, low rates encouraged consumers to make use of adjustable rate mortgages (ARMs) and Alternative A – paper (Alt-A) mortgages in the US subprime market. According to the Wikipedia definition, ARMs are mortgage loans with periodically-adjusted, variable interest rates, reflecting the cost of credit, and are therefore similar to the most common form of housing bonds in South Africa. ARMs are used in instances where it is difficult to get access to loans during periods of unpredictable interest rates. When interest rates fall, the borrower benefits from lower repayments as compared to fixed-rate mortgages. However, the borrower is at a disadvantage when interest rates rise. An Alt-A mortgage is a mortgage loan that is deemed riskier than a prime loan but less risky than a subprime loan. In this instance, borrowers have less favourable credit scores, higher loan-to-value ratios and do not possess all the qualifying documentation for a prime loan.

Historically, US mortgages were largely held at fixed rates. However, this trend changed during the housing boom years as ARMs became popular in the subprime segment of the mortgage market. These loans gave buyers the option of initially lower monthly payments as short-term interest rates were lower than long-term interest rates. During these years, subprime ARMs and “Alt-A” mortgages comprised more than 40 per cent of total mortgages issued as at the end of 2006 (Baker, 2008: p76). Furthermore, of the approximately USD1,4 trillion total exposure to subprime mortgages, around half of the potential losses were incurred by US leveraged financial institutions, such as commercial banks, securities broker-dealers (investment banks) and hedge funds.

Table 2.1 Total exposure to losses from subprime mortgages

	Total reported subprime exposure (USD billion)	% of reported exposure
Investment banks	75	5%
Commercial banks	418	31%
Government-sponsored enterprises (GSE's)	112	8%
Hedge funds	291	21%
Insurance companies	319	23%
Finance companies	95	7%
Mutual and pension funds	57	4%
Leveraged sector	896	66%
Unleveraged sector	472	34%
Total	**1368**	**100%**

Source: Greenlaw et al. (2008)

Between the fourth quarter of 2002 and the fourth quarter of 2006, US real house prices rose by more than 32 per cent, peaking in the second quarter of 2006. These strong gains in house prices resulted in the construction of more houses, as seen in US housing starts data which peaked at over two million new units in 2005, more than 50 per cent higher than levels seen prior to the housing bubble. Consumption was also strong, with the savings rate falling to less than 1,0 per cent between 2005 and 2007.

When the housing bubble eventually burst in 2007 after an oversupply of houses in the US property market, partly as a result of forced sales to pay off failed mortgage loans (particularly subprime loans) led to sharp declines in property prices. The S&P Case-Schiller Home Price Index[9] declined by almost 40 per cent from its 2006 peak to mid-2009 (Bloomberg data). The rise in mortgage defaults encouraged banks to tighten their lending standards and demand larger deposits from prospective homeowners, who could not afford these houses as the sharp decline in property prices had destroyed large portions of their equity and made refinancing impossible.

[9] The S&P Case-Shiller home-price index is a national (20-city composite) home price index that covers Boston, Chicago, Denver, Las Vegas, Los Angeles, Miami, New York, San Diego, San Francisco, Washington, DC, Atlanta, Charlotte, Cleveland, Dallas, Detroit, Minneapolis, Phoenix, Portland (Oregon), Seattle and Tampa.

The value of securities with exposure to the US housing market plunged, which had negative spillover effects on financial institutions on a global level as many of them had bought subprime related US structured investment products. Equity markets also suffered massive losses as market liquidity dried up and fears heightened surrounding the solvency of large and reputable financial institutions (including highly leveraged banks) who struggled to roll over their short-term financing or obtain cash in the interbank market. Against this backdrop, it became widely accepted that the bursting of the US housing bubble in 2007 was largely due to lax monetary policy between 2000 and 2004 and a lack of focus on the build-up of systemic risk and vulnerabilities in the financial system.

2.5.2 Wide global current-account imbalances

Global current-account imbalances have been identified as one of the key causes the global financial crisis. By definition, a current-account balance is equal to the difference between savings and investment. Therefore when one refers to global imbalances, it simply means distortions between savings and investment. A widely held view is that excess savings over investment in emerging market countries (such as China) led to current account surpluses. Investors channelled these excess funds to deficit countries such as the US, which led to a loosening in credit conditions, thereby resulting in lower global interest rates which created the credit boom in the US in the run up to the crisis (Skidelsky, 2010).

Bernanke (2009a) states that it is impossible to understand this crisis without reference to the global imbalances in trade and capital flows that began in the latter half of the 1990s. The statement of the November 2008 G20 summit also suggested that global imbalances played a major role in the run-up to the global financial crisis through a lack of consistency and co-ordination in macroeconomic policies and inadequate structural reforms, which led to unsustainable global macroeconomic imbalances which ultimately resulted in severe market disruptions and financial system instability.

During the early 2000s, the global economic and financial landscape was seemingly healthy, with most economies recording generally strong economic

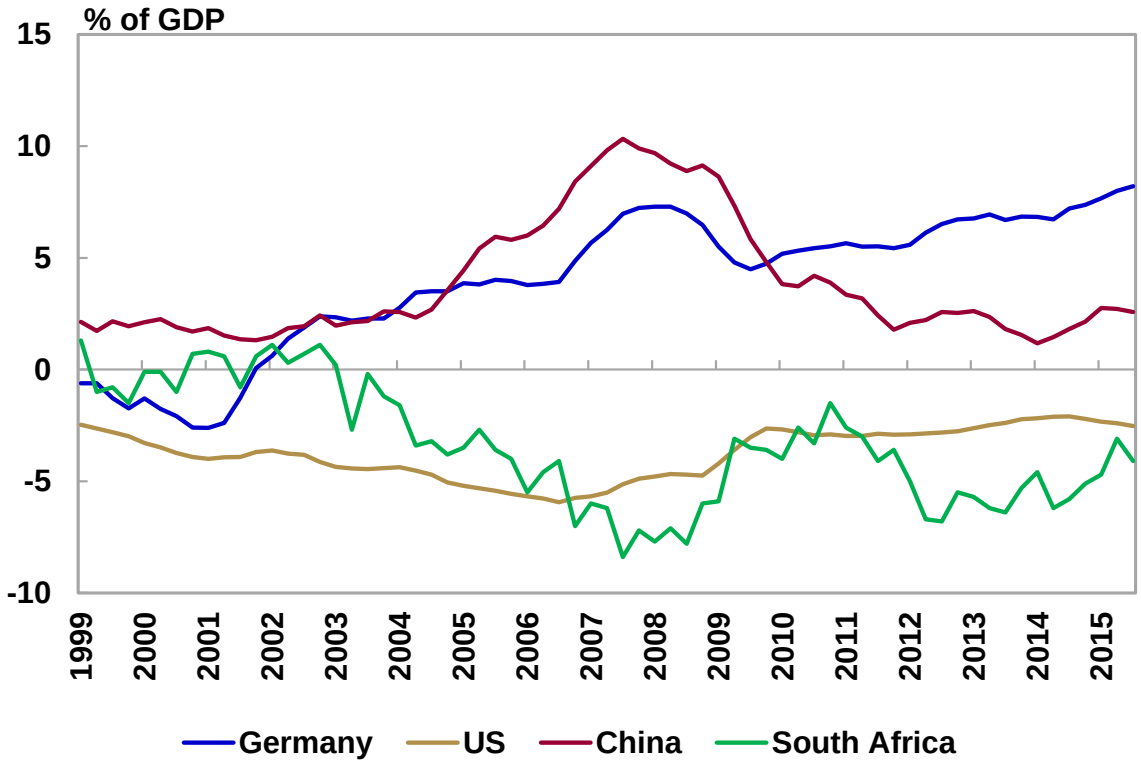
growth, benign inflation and healthy financial flows (particularly trade flows). The US current-account deficit reached around 2,4 per cent of GDP at the time of the Asian debt crisis in 1998, before climbing to 4,8 per cent in 2003 and peaking at close to 6,0 per cent of GDP in 2006, largely owing to high levels of investment and a low national savings rate (Obstfeld and Rogoff, 2009).

Pettinger (2007) identifies two other factors that caused the US current account deficit, namely, (i) a loss of competitiveness in the US and; (ii) a relatively strong US dollar for a country with a high current account deficit. The US was losing competitiveness, largely owing to US higher wage costs in comparison to US manufactured goods have been losing comparative advantage to Asian economies. The primary reason was that wage costs in US were much higher than their Asian counterparts. In particular, China's trade surplus with the US widened rapidly due to its low labour costs.

The US current account deficit was also affected by a strong US dollar relative to the current account deficit. Over the years, the US dollar benefited as investors in surplus countries poured funds into high-yielding risky US assets during the credit boom years. Once again, China, in particular, invested large amounts of funds in US government securities. As of the end of 2006, China held about USD699,0 billion of US securities, behind Japan at USD1,11 trillion (US Treasury). At the end of 2009, China reached its peak, owning about USD1,46 trillion worth of US government securities, the highest in the world and surpassing Japan at USD1,27 trillion.

These massive increases in holdings propped up the US dollar and encouraged the purchase of cheaper imports, thereby contributing to an imbalance between imports and exports, hence the wider current account deficit in the US (Mann, 1999). A number of other countries, such as Spain, Ireland, Portugal and Greece also ran large current-account deficits. Some of the main current account surplus countries included China and Germany (Figure 2.5).

Figure 2.5 Current account balances of selected countries



Source: International Monetary Fund database[10]

China's high economic growth in the three decades prior to the crisis, was largely due its high savings rate (Ma and Yi, 2010). Gross national saving as a percentage of GDP increased from about 35 per cent in the 1980s, to about 41 per cent in the 1990s and to record levels of 53 per cent in 2007, overtaking Japan, South Korea, and other East Asian countries to be amongst the highest on a global level. The high savings rate was seen to be a major contributor to the global saving glut, caused by the country's national saving exceeding total investment, resulting in a large current account surplus (Yang et al. 2011).

China was often criticised for intervening in foreign exchange markets to limit the appreciation of the renminbi against the US dollar and other currencies, in order to maintain its competitive export advantage (Morrison and Labonte, 2013). China's foreign exchange policy led many to believe that the renminbi was undervalued

[10] Data can be accessed from http://data.imf.org

against the US dollar and was a major contributor to the substantial US current account deficit in pre-crisis years.

Whilst the above-mentioned reasons do provide compelling arguments as to why the global savings glut possibly contributed to global imbalances as a key cause of the crisis, there are opposing views on the topic. Borio and Disyatat (2011) challenge the views of Bernanke (2005) and others. They argue that the "excess saving" view provides little distinction between saving (which is associated with a country's national account) and financing (which is associated with cash flows). Hence there is too much focus on net capital flows instead of gross capital flows, which effectively distorts the calculation of the natural rate of interest.

They concluded that the "excess saving" view did not sufficiently explain the trends witnessed during the US credit boom years. Borio and Disyatat (2011) also highlighted inconsistencies on a few key points relating to global imbalances. Their study examined the behaviour of longer-term interest rates versus the US current account deficit from 2005. They argued that the correlation between current account balances and longer-term policy rates is weak, as there did not appear to be a narrowing in the US current account deficit nor capital outflows from surplus countries when US dollar long-term interest rates increased between 2005 and 2007.

The second inconsistency that was highlighted by Borio and Disyatat (2011) was the weak relationship between the US dollar and US asset prices. In their study, they also argue that in theory, the US dollar should have exhibited an appreciating trend as foreign investors purchased US assets. This appreciating trend was not evident in the pre-crisis years. The third point of note was that there was also a weak correlation between global savings and the US current account deficit. As the US deficit began to narrow in the early 1990s, the global savings rate declined up until 2003, against a backdrop of rising saving rates in emerging markets.

Caballero and Krishnamurthy (2009) agree that although global imbalances played its part in exacerbating economic conditions during the crisis, it was not the key cause of the crisis. They argue that the problem was more of a safe-assets

structural deficiency. Safe assets are generally viewed as relatively low risk, but highly liquid in that there are buyers and sellers who are willing to enter into contracts. A structural deficiency or imbalance can occur when a market that has already gained from safe-haven investments gets flooded with more money in the event of more turmoil.

In this regard, global investors' quest for safe-haven assets placed enormous pressure on the US financial system, which buckled under the pressure when the subprime crisis emerged. The safe-assets deficiency worsened even after the US housing bubble burst as investors ran for cover into US government securities. Therefore they believe that the real challenge is how to address the structural problem of bridging of the safe-asset gap without making the global financial sector exposed to systemic risk.

2.5.3 Failure of financial regulation

The IMF (2009) stated that regulators failed to identify the build-up of systemic risk following rapid financial innovation and increased leverage and did not do much to mitigate these risks. They were too preoccupied with the formal banking sector and were consequently not sufficiently vigilant about the risks accumulating in the shadow banking system.

Financial innovation evolved since the 1970's as financial markets became deregulated and globalisation led to more cross-border trade and the creation of large and complex institutions. As discussed in 2.2, low interest rates and excess market liquidity led to global investors' search for high yield, which resulted in rapid expansion of financial innovative and complex products in the form of shadow banking securitisations such as MBSs, CDOs and CDSs. Investors initially welcomed these products as they were assumed to be low risk in nature while at the same time providing high nominal returns. Greenspan (2005) was also supportive of these innovations, stating that subprime growth in particular, had encouraged other forms of innovation that responded to market demand and benefited consumers.

The unregulated “shadow banking” system was identified as a key cause of the crisis. The Financial Stability Board (2011:1) describes shadow banking as “credit intermediation involving entities and activities outside the regular banking system". These banks provide the benefit of alternative sources of funding and liquidity to the financial system. However, their activities are largely unregulated and an important source of systemic risk, as the crisis has borne out. Shadow banks include investment banks, hedge funds and mortgage originators and are not subject to prudential capital requirements.

Kodres (2013) pointed out that the term “shadow bank” was invented by Paul McCulley who referred to these types of banks as non-bank financial institutions involved in maturity transformation, similar to commercial banks, where they use short-term deposits to fund longer-term loans. Shadow banks facilitate credit provision through a broad range of securitisation and secured funding instruments such as asset-backed commercial paper (ABCP), ABSs, CDOs and repurchase agreements (Sanches, 2014). The difference between the activities of traditional commercial banks and shadow banks is that the latter are largely unregulated and not subject to traditional bank regulation. Hence, shadow banks are not permitted to access credit lines from a central bank, as they do not have traditional depositors who can provide insurance to them to cover losses (Pozsar et al. 2014).

According to estimates of the Financial Stability Board (2011), the shadow banking system, on a global level, increased from USD27 trillion in 2002 to USD60 trillion in 2010, representing about 25 per cent to 30 per cent of the total global financial system and about 50 per cent of global bank assets. Shadow banks were highly exposed during the recent global financial crisis, after investors, particularly mutual money market funds, began to panic and withdraw funds from shadow banks when Lehman Brothers failed. To meet their repayment obligations to investors, these shadow banks were forced to do fire sales on their assets, which exacerbated asset price declines and eventually resulted in losses.

Traditional banks were negatively impacted due to their interconnectedness with shadow banks via the provision of sources of funding (Kodres, 2013). In other

words, traditional banks also incurred substantial losses as they had sold commercial paper and other short-term debt to shadow banks that repackaged these loans as derivative products and sold them to investors. The unregulated nature of these shadow banks was also characterised by a lack of disclosure on the value of their assets, thereby increasing the threat of bankruptcy. Panic arose during the crisis when traditional banks and shadow banks were unsure of who owed what to whom due to limited information on each other's asset values.

Additionally, banks were allowed to move substantial amounts of assets and liabilities off-balance sheet into complex legal entities called structured investment vehicles (SIV). This effectively meant that the parent bank could appear to be less leveraged and obtain loans at lower interest rates. When subprime loans began to default in 2007 and these SIVs began to experience severe financial difficulties, banks were still under contractual obligation to provide credit lines to the SIVs and their investors. As a result, banks' ability to lend was constrained and this led to a market liquidity squeeze as banks became reluctant to lend to the public as well as to each other.

There are different types of risk involved in derivatives trading, namely counterparty risk, market risk, liquidity risk and interconnected risk. Counterparty risk arises if one of the parties in the derivatives trade defaults on his obligations. The parties involved are the buyer, seller and dealer. Kiff et al. (2009) note that counterparty risk is systemic in nature because the failure of a big systemically important bank could have knock-on-effects on other banks that are interconnected to it and possibly lead to default amongst all the banks. The failure of a large bank could also cause a liquidity crisis as a large number of its counterparties would simultaneously want contracts to be replaced. This would affect interbank lending and trading volumes due to uncertainty about each other's exposure to securitisation products (Gregory, 2010).

Banks and investors generally purchase CDS protection from these "dealer" banks to hedge their assets or when giving an investment view. When these bonds go bad, the protection sellers of the CDS are expected to pay-out to the buyers of this

insurance. Counterparty risk was evident when Lehman Brothers failed as all the counterparties made losses.

Market risk refers to the general risk in any investment. Investors make decisions and take positions based on assumptions, technical analysis or other factors that lead them to certain conclusions about how an investment is likely to perform. An important part of investment analysis is determining the probability of an investment being profitable and assessing the risk/reward ratio of potential losses against potential gains. Market risk is often characterised by a financial loss that an institution incurs when the value of an investment decreases due to change in market factors.

The Fed (2016) identifies the following market factors as affecting the value of investments, namely (i) the institution's sensitivity of earnings and the value of capital to changes in interest rates, adverse movements in foreign exchanges rates, commodity prices, or equity prices; (ii) how an institution manages its exposure to market risk, taking into consideration its size, complexity and risk profile, (iii) the nature of the institution's interest rate exposure arising from non-trading positions and; (iv) the nature of market risk exposure arising from trading and foreign operations.

The third type of risk arising out of securitisation trading is liquidity risk. Pederson (2008) identifies two types of liquidity risk, namely (i) market liquidity risk, that is the risk that there is deterioration in the ease and speed with which assets can be sold in that market without adversely affecting the price, and; (ii) funding liquidity risk, that is, the risk that a trader is forced to close out his position ahead of the maturity of the instrument due to a sudden falling away of funding for that position. The two forms of liquidity risk are linked and have spillover effects in stressed market conditions, as poor funding can result in thin trade, thereby reducing market liquidity and exacerbating low trading volumes, thereby having a spiral effect.

The fourth type of risk is interconnection risk. This refers to how the interconnectedness between derivative instruments could impact on a derivatives

trade. This type of risk was also evident in the Lehman Brothers failure as the bank that performed a dealer function had spillover effects on its counterparties. During the crisis, the risks arising from these derivative products were largely hidden. Hence, it became difficult for institutions to price these instruments in the face of debt defaults (Lartey, 2012).

The financial system had also developed into a more market-based and interconnected system that not only consisted of securitised bank lending and the expansion of derivatives, but also of fair value accounting. According to the Financial Accounting Standards Board (FASB, 2006), fair-value accounting (FVA) refers to the accounting practice of valuing an asset at the price for which it could be exchanged in a current transaction between knowledgeable and willing parties. Market prices are used to calculate fair value, hence, FVA is also referred to as mark-to-market accounting.

William Isaac, the chairman of the Federal Deposit Insurance Corporation (FDIC) from 1978 to 1985, commented that FVA was one of the causes of the global financial crisis (Katz, 2008). He argued that subprime losses in the US comprised about 20 per cent in 2006, while federally insured US banks had recorded close to USD60 billion of losses in that market. The problem, however, was that the banks reported about USD150 billion in after-tax earnings and had USD1,4 trillion of capital. In this regard, FVA was regarded as a regulatory failure as banks were forced to reprice their illiquid assets down to extremely low fire-sale prices, which led to billions of dollars in accounting losses (but not cash losses), which caused a substantially reduced lending capacity of banks. It was felt that the quality of these assets was not always such that it merited the fire sale price, bearing in mind that many CDOs, and other structured products, still contained a large proportion of good-quality loans.

There were, however, studies done that indicate that FVA was not really to blame for the crisis. For example, a study by the US Securities Exchange Commission (SEC, 2008), mandated by Section 133 of the Emergency Economic Stabilization Act of 2008, concluded that FVA was not responsible for bank failures during 2008. Instead, losses incurred by banks were largely due to higher credit losses,

concerns about asset quality, as well as eroding business and investor confidence. This SEC study examined the FVA balance sheet activities of fifty financial institutions, where the combined assets of these institutions represented a minimum of 75 per cent of financial institutions' assets in the United States (Scott, 2010).

Laux and Leu (2009) also concluded that there was little evidence to suggest that FVA was a contributing factor to bank losses during the crisis. Their assessment was that FVA played a small role in institutions' income statements and regulatory capital ratios, except for institutions with large trading positions, where investors use their own discretion and judgment based on exposure to subprime loans. The study also concluded that there was limited evidence indicating that asset prices were inaccurate as a result of fire-sales or that institutions were obliged to do excessive write-downs.

2.5.4 Mispricing of assets by credit rating agencies

Weak risk assessment practices were identified as another key cause of the crisis. There was widespread agreement that credit rating agencies (CRAs) mispriced the value of complex structured and derivative products by deploying models that were inadequately designed to deal with such products.

In April 2011, a US congressional report concluded that Moody's and Standard and Poor's were responsible for triggering the 2007 financial crisis after they forcefully downgraded the previously inflated ratings they assigned to complex MBS products (Younglai and Lynch, 2011). Documents obtained from CRAs proved that they were aware of the risks facing the US subprime market before it collapsed, and nonetheless still failed to price these assets accordingly and reflect this in their ratings. Between 2004 and 2006, the amount of requests for the rating of structured financed products increased substantially (Bahena, 2010). This was largely due the fact that investors themselves had limited knowledge at their disposal pertaining to these complex products and consequently relied heavily on CRAs to carry risk assessments.

Amadou (2009) agreed that CRAs played a key role in causing the crisis after the unexpected credit rating downgrades on these complex structured finance products led to substantial bank losses and a resulting liquidity squeeze in the global financial system. It became clear that CRAs themselves lacked a clear understanding of the dynamics and underlying risks facing these complex structured and derivative products. The methodology behind these ratings was clearly flawed in design, resulting in CRAs assigning excessively high ratings (AAA ratings) to CDOs, MBSs, Alt-A mortgages and subprime mortgages.

Once CRAs began implementing rapid downgrades of these derivative products, ratings of ABSs for example dropped from AAA to non-investment grade, including default. Panic ensued in markets after market prices became unavailable or inaccurate for many securities, included those that were AAA-rated (Crouhy, 2009).

2.5.5 Compensation-driven incentives encouraged risk taking

Large executive-compensation driven incentives were seen as a factor that encouraged excessive risk-taking and greed in financial markets in return for higher remuneration. As a result, executives of large banks were blinded by greed and failed to consider longer-term risks and the build-up of financial imbalances in the system.

Excessive risk-taking is described as actions that could possibly provide short-term benefits to investors, but create systemic risks to the financial system as a whole (Sharma, 2012). Generally speaking, performance incentives, which include asset accumulation, sales targets, share prices and short-term profit generation, do have the tendency to encourage executives to take excessively high risks to generate short-term profit and receive high remuneration in return.

Studies done by Sharma (2012) looked at whether risky policy decision was influenced by the salaries of senior executives in financial institutions. Their findings indicate that there was indeed strong evidence showing that bank executives who received higher pay packages tended to have a higher appetite for

risk-taking. Drasic and Velinova (2011) also came to the conclusion that incentive pay in bull markets are excessively high, therefore encouraging managers of poorly managed funds to take on excessive risk to outperform their peers and receive higher pay incentives.

To discourage excessive risk-taking behaviour by executives, the FSB in 2009 introduced guiding principles for effective executive compensation, with the intention of aligning risks with payments. The Implementation Standards outlined specific proposals on compensation governance, structure and disclosure to strengthen compliance with the FSB Principles for Sound Compensation Practices (FSB, 2009b). These proposals included (i) oversight of pay policies and practices; (ii) linking pay packages to the overall performance of the organisation, (iii) reviewing pay and risk alignment, vesting and clawback arrangements; (iv) placing limits on guaranteed bonuses; (v) ensuring greater public disclosure of salaries; and (vi) ensuring appropriate oversight of pay incentives and putting corrective measures in place.

2.6 THE SOUTH AFRICAN EXPERIENCE

Prior to the most recent crisis, the South African economy was performing relatively well, recording GDP growth of around 5,0 per cent between 2004 and 2007 (Table 2.2). By 2007, growth was approaching the government's targeted 6,0 per cent level needed to halve poverty and unemployment by 2014 while GDP per capita had risen by 22 per cent since 1999, fixed capital investment gained 10 per cent and more than 1,5 million jobs had been added to the economy (SARB, 2007).

Table 2.2 Performance of selected macroeconomic indicators in South Africa

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Real GDP growth (%)	5,4	5,1	3,7	-1,8	2,9	3,5	2,5	1,9	1,5	n/a*
Headline CPI (%)	4,7	7,2	11,5	7,1	4,3	5,0	5,6	5,7	6,1	n/a
Money supply growth (%)	22,5	23,6	14,8	1,6	6,9	8,3	5,2	5,9	7,3	n/a
repo rate (year-end)	9,0	11,0	11,5	7,0	5,5	5,5	5,0	5,0	5,75	6,75
Budget balance debt (% of GDP)	-0,4	1,7	-1,0	-6,7	-4,6	-4,4	-3,7	-3,8	-3,6	n/a
Current account balance (% of GDP)	-6,5	-7,3	-7,1	-4,0	-2,8	-3,4	-5,2	-5,8	-5,4	n/a
Government expenditure (% of GDP)	26,3	29,3	30,8	34,1	32,2	32,1	32,1	33,3	32,0	n/a
Government revenue (% of GDP)	25,9	31,0	29,7	26,8	27,6	27,7	28,1	29,4	28,4	n/a
Rand/USD (year-end)	R6,99	R6,86	R9,4	R7,4	R6,6	R8,1	R8,8	R10,5	R11,6	R15,5
Ten-year government bond yield (at year end)	7,85	8,55	7,22	9,04	8,14	8,11	6,78	8,23	7,96	9,76
JSE all-share index (%)	37,7	16,2	-25,7	28,6	16,1	-0,4	22,2	17,8	7,6	1,9

Source: South African Reserve Bank

*Final statistics for 2015 not published

Furthermore, the country adopted prudent fiscal and monetary policy and had a flexible exchange rate which acted as a buffer during times of excessive market volatility and disorderly portfolio outflows. South Africa's fiscal position was relatively healthy, with both the size of its debt relative to GDP and the primary budget deficit being markedly lower than most core European countries, the US and Japan.

When the global financial crisis emerged in 2007, the South African financial sector was relatively immune to global developments, largely owing to the country adopting a sound framework for financial regulation and implementing conservative yet strong risk management practices at financial institutions, which ensured limited trading of derivatives and securitisation products and limited

exposure to foreign assets, compared to advanced economies such as the US and eurozone (National Treasury, 2013).

In addition, there was an increased focus on reducing household vulnerability which resulted in the implementation of the National Credit Act which protected consumers against reckless lending practices (such as subprime lending) by banks. The country's sophisticated and well-regulated financial sector limited any risk of systemic bank failures or liquidity crises. At no stage, during or after crisis, was the SARB required to provide additional liquidity lines to the financial system.

However, as the financial crisis worsened and spread to other parts of the globe, South Africa's real economy and financial markets could not escape the spill-over from the crisis, given South Africa's strong interconnectedness with the global economy, particularly with its largest trading partners, the eurozone, US and China.

By 2009, spill-over effects from the global economy into the domestic economy via trade and financial flows and a decline in consumer demand and private investment, resulted in GDP growth contracting by 7,4 per cent and 2,8 per cent in the first two quarters of 2009 and by 1,8 per cent for the full year (see Table 1). This marked South Africa's first economic recession in almost 17 years.

As mentioned earlier, South African banks were largely insulated from the direct effects of the global financial crisis. However, banks were indirectly impacted through higher non-performing loans due to job losses among its borrowers caused by a decline in economic growth. The country's unemployment rate rose to 24,3 per cent in 2009 with a loss of 870 000 jobs (The National Treasury, 2010). In order to cushion the domestic economy from adverse global conditions, the SARB reduced the policy rate by 350 basis points to 8,5 per cent in April 2009 as inflation fears eased and the economic situation deteriorated. On the fiscal side, the crisis led to a sharp decline in domestic tax revenue, thereby requiring increased government spending to support growth. The impact of global developments was also visible in South Africa's financial markets, particularly equity, foreign exchange and bond markets, owing to heightened volatility.

2.7 CONCLUSION

In summary, many key factors contributed to the evolution of the financial crisis. Widening global imbalances, particularly between the US and China since the early 2000's, was a key factor attributed towards lax monetary policy in the US and a build-up of hidden vulnerabilities in the financial system. Lower interest rates attracted vast amounts of capital from global investors, thereby creating ample liquidity in the financial system, spurring investors to take excessive risks in the search for higher yield in the US property market which was booming at the time. Simultaneously financial innovation advanced, while banks and regulators had limited knowledge of the underlying risks posed by these instruments as well as the system-wide impact in the event of a crisis.

In the initial stages of the crisis not all countries were seriously impacted, owing to prudent macroeconomic policies and well managed fiscal and monetary policy. Others did not have deep linkages with the US and Europe so were little impacted by the effects of the subprime crisis and distressed markets. However, as the crisis worsened, almost every country in the world became affected through second round effects, via a decline in consumer confidence which negatively impacted world trade. As a result, many countries globally experienced economic downturns or recessions, triggering unconventional and aggressive policy actions by regulators. Policymakers adopted QE while fiscal policymakers embarked on increased government spending and reducing taxes to support economic growth.

The main debate globally was the role of monetary policy and the fact that whilst flexible inflation targeting was the most appropriate way to achieve monetary policy objectives in the past, this was no longer the case. There was wide consensus that central banks should adopt a set of multiple objectives, namely; (i) to maintain price stability; (ii) to support long-term economic growth and stable employment while still preserving the medium term price stability objective; and (iii) to promote financial stability in the financial system. Many key central banks such as the ECB, BoE, Fed, BoJ and others have made important progress in putting some of these systems in place. Looking ahead, the challenge is for central banks to come up with better ways to achieve these dual objectives of price stability and financial stability.

CHAPTER THREE

LESSONS LEARNT FROM THE CRISIS AND SALIENT FEATURES OF MACROPRUDENTIAL POLICY

3.1 INTRODUCTION

The 2007-2009 global financial crisis highlighted the stand-off between challenges of advanced economies facing dislocated financial systems and central bank efforts to provide stimulus to stabilise markets and boost economic growth. Furthermore, the emergence of the European sovereign debt crisis in 2010 was a major setback for the global economic recovery, particularly for emerging market economies that were fairly insulated from the US subprime crisis given their low exposure to those markets.

At many stages during the crisis, questions were raised about the roles and duties of central banks, policy response outcomes as well as intended or unintended consequences of the crisis. The following sections will discuss the lessons learnt from the crisis as well as a description of macroprudential policy and financial stability which were identified as the missing pillars in the design of central bank frameworks.

3.2 KEY LESSONS LEARNT FROM THE 2007-2009 FINANCIAL CRISIS

3.2.1 Financial stability should be an additional objective of central banks

The global financial crisis raised questions about the effectiveness of monetary policy with a single objective of price stability, using the interest rate as a single instrument. Monetary policy since the 1990s was relatively successful at ensuring low stable inflation and strong economic growth. However, the most recent crisis has taught us that price stability was not a pre-condition for financial stability (IMF, 2013a).

Interestingly, prior to the 2007 financial crisis, there were some key emerging market central banks that had financial stability as part of their policy frameworks (Mohanty, 2010). For example, China, India and Russia used a range of macroprudential tools such as the reserve requirement (RR) ratio to slow down credit. Other central banks such as Indonesia and Korea used credit ceilings to limit bank credit extension and/or provide credit lines to small and medium enterprises. Other tools used by emerging market central banks included loan-loss provisioning requirements as well as loan-to-value (LTV) ceilings on mortgage loans, to be discussed further in chapter four.

The challenge facing central banks in the post-crisis period was how to design and implement a governance framework to take into account financial stability (Acharya, 2015). Some key issues for consideration were: (i) whether to include financial stability as an objective of monetary policy or as a separate target (i.e. institute a dual mandate); (ii) how to co-ordinate macroprudential policies with monetary and fiscal policy to achieve the objectives of financial stability and price stability without compromising the effectiveness of the monetary policy transmission mechanism; (iii) what types of macroprudential tools should be the most effective to measure systemic risk; (iv) how to promote international co-ordination with other central banks, given spillover effects from the bursting of credit and asset price bubbles abroad and; (v) who should be accountable for the governance of financial stability (government or central bank) for the setting of the target and controlling of the target.

According to the IMF (2009b), macroeconomic policies did not target systemic risk prior to the crisis and as a result monetary policy failed to respond to the build-up of systemic risk due to credit-driven asset price bubbles. Hence, there is strong justification for central banks to expand the mandate of monetary policy to include financial as well as price stability.

3.2.2 The failure of mainstream macroeconomics to understand monetary policy and financial stability

A key lesson learnt from the crisis was that mainstream macroeconomics failed to understand financial stability and incorrectly assumed that interest rates and the determinants of money creation reflected a sufficient analysis of financial variables. Regulators had a mandate to change money supply and interest rates, which mainstream economic theory, alongside central bank theory, viewed as sufficient to stimulate economic growth (Stoop, 2010:21).The traditional banking system consists of commercial banks and a central bank, whereby a central bank provides liquidity (money) to commercial banks, which act as financial intermediaries to provide loans to investors. Hence, a central bank has the power to increase the supply of money in the financial system (Mankiw 2010). Short-term loans are made by private agents against collateral, which consists of central bank reserves.

In a recent policy paper by the Bank of England (2016:38), it was acknowledged that mainstream monetary policy was erroneous for many decades prior to the 2008 financial crisis. Whilst the traditional banking model consists of banks that play an intermediary role in facilitating pre-existing loanable funds between depositors and borrowers, in reality, these pre-existing loans or banks that provide these loans, do not exist. Instead, banks actively manage their balance sheets by providing new loans via the matching of loan and deposit entries on their balance sheets. The paper further concluded that in the current environment, the deposit multiplier mechanism (that is, when a bank's reserve requirement ratio determines how much loans can be extended, and hence the amount of created deposits) is non-existant. This conclusion was based on the premise that it is not just quantitative restrictions (reserve requirement ratio) that influences a bank's ability to create money, but instead, it is also a bank's assessment of future profitability and solvency issues that determines money creation.

Rasmus (2016:1) was in agreement that mainstream economics tended to focus too much on real variables (such as money, changes in technology, cost of capital and expected rates of return on investment), and too less on financial variables

(such as the distinction between money and credit, the growth of non-money forms of credit and the emergence of the shadow banking system. Hence, they largely ignored financial vulnerabilities that were building up in the financial system and offsetting the effects of interest rates on real investment and economic growth.

3.2.3 Reaching the zero interest lower bound is not the end of expansionary monetary policy

Prior to the 2007 financial crisis, monetary policy was generally viewed as an effective tool to ensure price stability and short-term macroeconomic stabilisation (IMF, 2015b). Sovereign debt crises were believed to be a characteristic of emerging markets and a remote possibility in advanced economies.

An important issue that arose out of the crisis was whether price stability was in fact an efficient primary objective of central banks globally. At the onset of the crisis when aggregate demand in most countries declined sharply, central banks in the US, eurozone, UK, Switzerland, Canada and Sweden responded by reducing nominal policy interest rates to close to zero. This was referred to as the zero interest lower bound.

As the crisis worsened, central banks could not reduce policy rates further. This led to central banks shifting their focus to other policies such as targeting longer-term interest rates or monetary expansion by purchasing large amounts of long-term assets (QE by the US Fed) or targeting higher inflation to prevent deflationary expectations (ECB, BoJ, BoE). Although central banks were forced to adopt QE, they also had to rely on fiscal policy when economic conditions deteriorated further. Most advanced economies resorted to injecting fiscal stimulus in their economies to support growth (Stark, 2009) as well as bailing out troubled banks, resulting in heavy fiscal burdens on countries' finances.

The role of fiscal policy in promoting the economic recovery became more prominent during the peak of the 2007 global financial crisis and also highlighted

the importance of having enough fiscal room to stimulate the economy through deficit spending. Fiscal policy was constraining for some advanced economies, such as the US and Japan which already had high levels of debt. Some peripheral European countries like Portugal, Italy, and Greece prior to the crisis, had excessive public debt and fiscal deficits which were driven largely by high levels of civil servant wages and the resultant high levels of consumption. During the crisis, fiscal policies became procyclical due to the obligation of governments to reduce spending and increase taxes in order to contain sovereign debt levels. Procyclical fiscal policy refers to instances when governments resort to increasing public spending and reducing taxes during good economic times, and reducing spending and increasing taxes during economic recessions (Alesina and Tabellini, 2005).

3.2.4 Efficient financial systems are a necessity

During the 2007-2009 global financial crisis, most advanced economies such as the US, eurozone, UK and Japan were more severely impacted by the crisis than was the case in emerging markets, largely due to weaker financial systems and a lack of adequate regulatory controls. According to Fischer (2011), a financial system is robust and efficient when the monetary policy transmission mechanism functions smoothly, meaning that a change in policy rates translates into a change in consumer spending. The crisis revealed that, despite effective monetary policy transmission mechanisms and efficient allocation of resources through free cross-border flows of capital between countries and regions (thereby promoting economic growth), financial systems can also be complicated by these cross-border flows in times of crisis, given the strong interconnectedness between domestic and international financial systems as well as the real economy.

One of the major challenges facing global financial markets is the upside risk associated with massive amounts of foreign investment in US government securities. A sharp sell-off in US Treasury bonds would have negative consequences for the value of the US dollar, given its status as the reserve currency of the world and the fact that currencies pegged to the US dollar are subject to any type of currency intervention, depending on country-specific circumstances (Morrison and Labonte, 2013).

A sell-off would also have negative consequences for large holders of US government securities, such as China and Japan, as it implies that their currencies would appreciate against a depreciating US dollar, thereby eroding their exports. Furthermore, as evidenced by recent crises, capital outflows can result in weaker exchange rates as well as have disruptive consequences for the balance of payments. In order to be prepared for future financial crises, it is imperative that policymakers adopt sound macroeconomic policies and ensure that appropriate financial regulation and supervisory practices are in place.

3.2.5 More flexibility is needed in exchange rate policy to temper global imbalances

The build-up of global imbalances has been largely attributed to advanced economies adopting monetary-expansion fuelled growth models and emerging markets following export-oriented growth models, which led to huge divergences between savings and investment (Mohanty, 2011). Prior to the crisis, current account imbalances comprised about five per cent of global GDP in 2008, with the US having the largest deficit and countries such as Germany, Japan, China and oil exporters dominating the world's surplus (Padoan, 2014). However, in the aftermath of the crisis, global imbalances have narrowed significantly, largely owing to slower monetary growth in the US and a decline in oil prices. China's current account surplus narrowed from its pre-crisis peak of 11,0 per cent of GDP to about 2,3 per cent in 2012, while the US current account deficit narrowed from its pre-crisis peak of 6,0 per cent to 2,7 per cent in 2012.

Despite these positive developments, there were concerns that a new set of imbalances could emerge, given that advanced economies and emerging markets are at different stages of economic recovery and have conflicting monetary policy objectives. As advanced economies embark on gradually withdrawing stimulus from markets, emerging markets such as China, Indonesia, Turkey and India on the other hand, began tightening monetary policy to alleviate inflationary pressures. In light of these developments, wider interest rate differentials were a key factor leading to large capital inflows into emerging markets.

Over the past few decades, some emerging Asian economies, particularly China, which adopted rigid exchange rate policies against the US dollar, have been contributing factors to global imbalances. Looking ahead, it is important that greater exchange rate flexibility is applied to contribute to a more orderly unwinding of global imbalances. There also needs to be co-ordination amongst key advanced economies and emerging economies in managing exchange rates and capital flows. In this regard, more flexibility in China's exchange rate is needed to ensure rebalancing of growth on a global level and to limit the risk of a build-up of global imbalances.

3.2.6 The important distinction between a liquidity crisis and a solvency crisis for the lender of the last resort

A lesson learnt from the crisis was that the distinction between a liquidity problem and a solvency problem was not well understood (Fischer, 2015). This distinction is quite important as it has monetary policy implications during times of a financial crisis, with regard to the role of a central bank as a lender of last resort, In addition, the crisis questioned the extent to which central banks should intervene in the market to inject liquidity or purchase non-performing assets of bankrupt banks.

History indicates that in recent financial market crises, central banks have played the role as a lender of last resort by injecting liquidity into markets when there is a "liquidity crisis". A liquidity crisis occurs when financial institutions are in financial distress and cannot get cash to pay for expenses in the short term. Therefore there is a shortage of liquidity in the financial system which causes panic in markets and erodes confidence.

In contrast, a "solvency crisis", occurs when the net worth of financial institutions has become negative, often because they were overly leveraged and a relatively small loss in assets values has caused equity to become negative. During the crisis, there was uncertainty over the role of the central bank in the event of a solvency crisis. The challenge faced by a central bank in a solvency crisis is that when a financial institution is insolvent, any intervention measures by the

government such as providing emergency liquidity or recapitalising it, could lead to long-term costs for the public sector. This is largely owing to the fact that all profits of a central bank are transferred to the government and any intervention to stabilise markets and ensure financial stability could negatively impact central bank profits and, as such, spendable government income.

A liquidity crisis, on the other hand, is deemed as being less complicated than a solvency crisis as there are no long-term cost implications for the public sector in the event of central bank intervention to rescue a financial institution or the financial system itself. It is thus important for a central bank to distinguish between a liquidity crisis and a solvency crisis to enable it to know when to intervene in the financial system to assist financially-distressed institutions and prevent systemic failure of other institutions.

3.2.7 The moral hazard in “too big to fail” should be reduced

The failure of a large bank is likely to pose a risk to the solvency of other institutions, due to the interconnectedness of these institutions through mutual obligations. As witnessed during the crisis, liquidity froze after banks became reluctant to lend to each other when subprime loans began to default. In this regard, a key lesson learnt was that it is a necessity for governments to provide insurance to uninsured creditors at big banks to protect them against losses in the case of a bank failure as well as prevent losses from spreading to other banks in the financial system (Fischer, 2015).

An example of this type of insurance is federal deposit insurance in the US, which guarantees the deposits of bank creditors up to a certain amount in the event of bank failure. However, this type of deposit insurance could have an unintended consequence of creating a moral hazard problem. Big banks would be encouraged to take excessive risks, with the knowledge that the central bank and the government would bail them out with additional liquidity and capital in the event of financial difficulties.

This would result in even more risk-taking and misallocation of resources, thereby threatening financial stability. In essence, the more extensive the deposit insurance offered to uninsured creditors, the bigger the moral hazard problem (Stern and Feldman, 2004). The challenge for central banks lies in designing a regulatory and legal framework in which a big bank can be deemed to be insolvent, allowed to fail and be wound down in an orderly manner that does not pose systemic risks to the stability of the financial system. The only way to do that is to have smaller banks.

3.2.8 Procyclicality in the financial system should be minimised

Landau (2009) argues further that procyclicality not only implies fluctuations around the trend, but also signals changes in the trend itself as well as possible cumulative deviations from its equilibrium value. Period of financial distress often follow boom periods of strong credit and asset price growth due to accommodative monetary policy and low-risk environments. This leads to over-leveraging and heightened risk-taking by investors (CFGS, 2010). During these boom times, banks generally do not build up sufficient capital buffers to protect themselves against future market distress or financial crises.

This was evident in the pre-crisis years, where procyclicality in the financial system ultimately contributed to higher systemic risk and spillover effects to the real economy during the financial crisis. The banking sector is susceptible to procyclicality, largely owing to high leverage and inflexible risk management systems and capital requirements which result in a tightening in credit standards during times of an economic slowdown (IMF, 2013a).

A lesson learnt from the crisis was that regulators should increase the amount of capital requirements of banks during economic upswings, and thereby create a buffer of additional reserves on which banks can draw during an economic slowdown. Regulators should also from time to time assess compensation structures to ensure that they do not create incentives for excessive risk-taking (Brunnermeier, 2009).

From an asset allocation perspective, institutional investors generally take long-term views on asset performance which enables them to sit out short-term volatility in asset prices. However, procyclicality can hurt asset prices and economic growth if investors collectively take action (referred to as “herd behaviour”), thereby leading to higher volatility in asset prices and instability of the financial system.

3.2.9 Financial intermediation matters

Financial intermediation refers to the allocation of capital by banks to businesses to promote growth and expansion. Capital allocation can be done via direct and indirect financing. Direct financing is when savers and borrowers interact directly with each other in the market while indirect finance refers to the use of financial intermediaries. Generally speaking, the traditional model of financial intermediation requires a bank to accept retail deposits from households and lending out the proceeds to borrowers such as firms or other households (Adrian and Shin, 2010).

The rapid advancement of growth in the financial sector as well as financial innovation and ultimate collapse of subprime mortgages led to a disruption in financial intermediation in the US, following the failure of Lehman Brothers. Banks were highly reliant on the wholesale funding market, which was less stable by the traditional retail deposit base as neither financial institutions nor regulators understood the complexity of the wholesale funding market or the systemic-wide risks that accompanied it.

Thus, when Lehman Brothers went into financial difficulty, investors began to panic and withdrew funds from banks, causing more panic amongst other investors and banks. As a result, there was a loss in confidence and interbank markets in the US and Europe became dysfunctional. Money-market rates were no longer linked through arbitrage and central bank policy rates became ineffective. An important lesson learnt is that financial intermediation does matter and that it is critical for regulators and investors to have a deep understanding of the functioning of the financial sector and the role of indirect financing (Woodford, 2010).

The lack of focus on macroprudential policy and financial stability on the part of central banks has been identified as one of the key causes of the crisis (G30, 2015). Since the early 2000s and particularly after the 2007-2009 global financial crisis, macroprudential policy and financial stability has been gaining more prominence, becoming one of the most frequent discussion points in global central banks, with many central banks, including South Africa's, adopting financial stability as an additional objective. The objectives of monetary and microprudential policy mostly been more clearly understood. However, there has been less clarity in the case of financial stability and macroprudential policy, particularly with regard to the interaction between macroprudential policy and microprudential policy. This section is intended to discuss the definition, objectives and salient features of macroprudential policy.

3.3 DEFINITION AND SALIENT FEATURES OF MACROPRUDENTIAL POLICY

Definition of macroprudential policy

The term "macroprudential" was coined in June 1979 at a meeting of the Cooke Committee, which was the precursor for the present Basel Committee on Banking Supervision. According to Clement (2010), at the time, macroprudential policy represented a type of systemic positioning of regulation and supervision connected to the general macroeconomy. As time went by, the macroprudential theme started to become an important point of discussion in institutions such as the BIS as a tool to promote the stability of the financial system.

There have been various definitions of macroprudential policy. According to the G20 (2011) and the IMF (2013c), macroprudential policy is viewed as the deployment of prudential tools to limit systemic risk and minimise disruptions or market distress in the financial system that could have adverse consequences for the real economy. The important concepts in this definition are "systemic risk" and "market distress". "Systemic risk" refers to the risk that a shock will cause damage to the financial system in its entirety, (as opposed to damage to an individual

institution) and that there might be spillover effects to the real economy. Microprudential regulation is responsible for mitigating idiosyncratic risk at the individual institution level (De Nicolo and Kwast, 2001.) “Market distress" is a situation in which the financial system cannot function properly on account of impaired trading conditions and a dry-up in liquidity conditions (Crockett, 2001). In this regard, the aim of macroprudential policy is to prevent financial instability.

Mishkin (1999) describes financial instability as a situation where a shock negatively affects information flows in a financial system to the extent that the financial system finds it difficult to facilitate the flow of funds from surplus units to deficit units with productive investment opportunities. If the impairment to the financial system is severe enough, it can result in a dysfunctional market, which can be regarded as a financial crisis. Similarly, the SARB (2015d) states that financial instability ultimately becomes visible through systemic risk, banking failures, extreme asset-price volatility, interest and exchange rate volatility, and a collapse of market liquidity. Accordingly, this manifests into a disruption of the payment and settlement system.

Some of the adverse consequences for the financial system as a whole and their spill-over into the real economy can be mitigated by early detection. Claessens and Ghosh (2013) are of the opinion that macroprudential policy should aim to detect financial crises early enough to prevent vulnerability in the financial system and contractions in the real economy. This can be achieved by focusing on the financial system as a whole, rather than individual institutions. Similarly, Caruana (2010b) describes the objective of macroprudential policy as the mitigating of systemic risk by identifying common exposures and addressing the interlinkages amongst all financial institutions, and well as dealing with procyclicality in the financial system.

The next section provides an understanding of systemic risk and other salient features of macroprudential policy.

Systemic risk and other salient features of macroprudential policy

Visco (2011) advocates that systemic risk poses a number of challenges to policymakers, largely due to the fact that it is difficult to measure and also difficult to detect. These challenges have important implications for the design and implementation of macroprudential policy.

The IMF et al. (2009a) view systemic risk as being caused by an impairment of key components of the financial system. These components are made up of financial intermediaries, financial markets and the infrastructural platform which consists of payment, settlement and trading systems. In the event of a large market shock, the failure of large and interconnected institutions as well as the build-up of imbalances in the financial system, systemic risk can be disruptive to the financial system. The disruptions can be transmitted through the channels of employment, wages and prices to the real economy (Trichet, 2009).

Eijffinger and Masciandaro (2012) highlight that systemic risk reflects a loss in confidence and increased uncertainty about the functioning of the financial system and its interconnected parts. Contagion effects are inherent in systemic risk and arise when an economic shock to markets, countries, or institutions, spills over into other markets, countries, or institutions. Contagion involves an initial economic shock, and its subsequent spread over virtually all financial institutions and markets, both locally and internationally.

Pritsker (2000) identified four types of contagion channels, namely; (i) correlated information channel; (ii) common financial institution (FI) channel; (iii) cross-market rebalancing of hedging channel; and (iv) wealth shock channel.

The correlated information channel is characterised by a set of common macroeconomic factors that determine assets values in multiple countries due to the real interlinkages between asset classes and financial markets. The correlated information channel is not easily detected as it can be influenced by herd behaviour or economic shocks which can result in institutions failing to exercise sound judgment between good and bad assets (Dijkman, 2010).

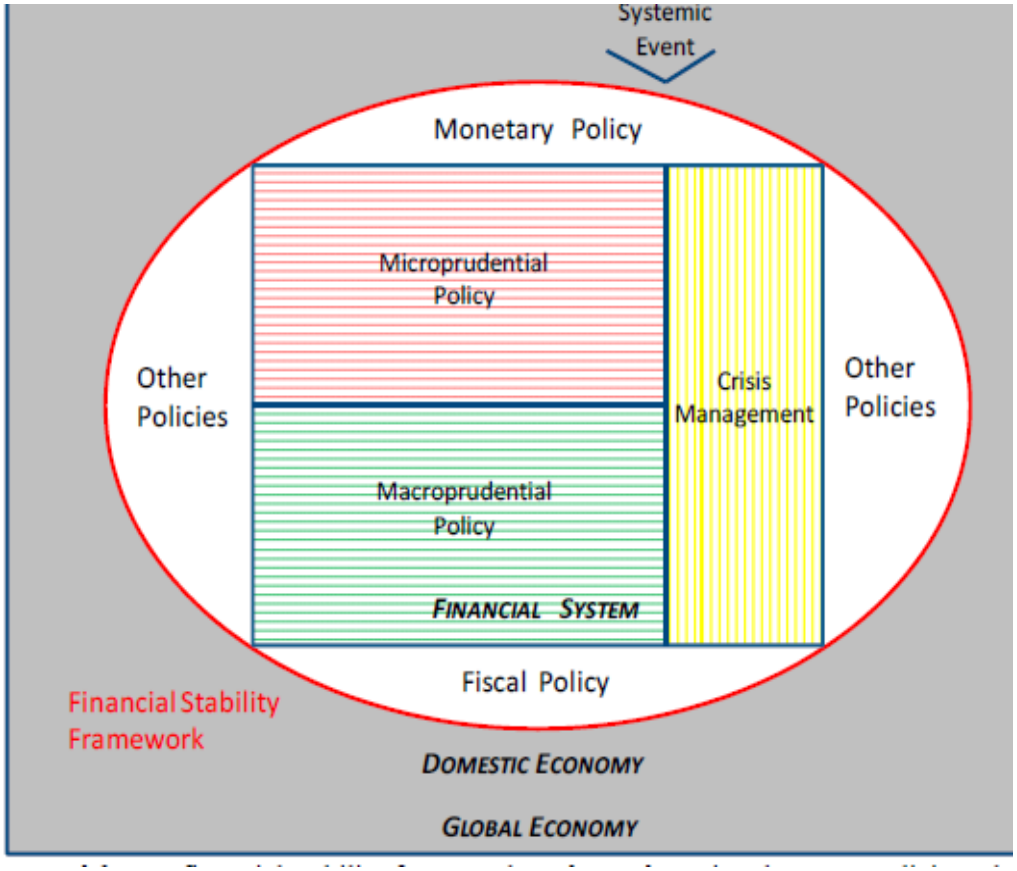
The FI channel is where an economic shock in one country affects the capital position of an international bank that provides loans to that country. Because the same international bank could also provide loans to other countries, risks spread to these countries. It is important for an international bank to make adjustments to its loan portfolio from time to time, depending on a country's economic circumstances (Claessens and Forbes, 2013).

The cross-market rebalancing or hedging channel is where contagion can take place between two countries that are uncorrelated, due a third country having linkages with both countries. In these instances, investors tend to cross-hedge macroeconomic risks by adjusting their portfolios in response to economic shocks between the countries (Vester, 2006).

Finally, the wealth shock channel arises if an investor experiences a sudden loss of wealth and chooses to adjust his portfolio holdings. This typically happens in periods of a reduction in risk aversion, where investors can channel their holdings from risky to safe-haven investments as their wealth declines. This behaviour, however, could reinforce the correlated liquidity shock and be influenced by herd behaviour (Lizarazo, 2005).

The IMF (2011b) highlights that when defining the boundaries of macroprudential policy, it is important to note that other public policies also impact on financial stability (Figure 3.1).

Figure 3.1 Financial stability framework and macroprudential policy



Source: IMF, 2011b

Figure 3.1 illustrates the common responsibilities that other policies have in achieving financial stability through the mitigation of systemic risk. The primary responsibility for ensuring financial stability lies with macroprudential policy. However, it is also important that other policies such microprudential policy (monetary policy), crisis management policies and fiscal policy be complementary to macroprudential policy in the achievement of its objectives in identifying and mitigating systemic risks that arise.

Borio (2003) suggests that systemic risk has two key dimensions, namely, a time dimension and a cross-sectional dimension.

The *time dimension* indicates the build-up of systemic risk during cyclical upswings when agents underestimate the risks they are taking, which thus refers

to its procyclicality. Procyclicality arises when mutually reinforcing interactions between the financial and the real sectors of the economy have the effect of amplifying financial cycle fluctuations, thereby causing financial instability (Financial Stability Forum, 2009:8). In this regard, asset price shocks have an immediate effect on the net worth of investors who hold these assets in a mark-to-market accounting system. The amplifying effect comes into play, among other things, when financial institutions use borrowing to leverage their exposure to risky assets, resulting in spillover effects to those who make claims on those holding the assets. Landau (2009:2) argues that an over-leveraged firm faces high levels of risk when there are asset price shocks as its equity capital could diminish quickly.

Similarly, Allen and Carletti (2011:39) state that when a financial system is over-leveraged, 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.

Alternatively, a negative shock could erode depositors' confidence and make an institution vulnerable to the risk of bank runs, thereby creating liquidity shortages and forcing institutions to hoard liquidity or dispose of financial assets at low market prices to meet depositor's withdrawals. In instances like these, negative externalities related to firesales can materialise, with a sell-off in financial assets causing sharp declines in asset prices, resulting in an impairment of balance sheets of intermediaries. The subsequent deleveraging impacts the real economy through a reduction in credit availability.

During the financial crisis, European banks had large exposures to the weaker sovereign bonds and as the European debt crisis worsened, bank and sovereign risk began to destabilise the financial system by promoting herd behaviour while also placing governments under immense pressure to simultaneously deal with troubled banks and a dysfunctional government bond market. Herd behaviour is when the individual and collective behaviour of investors creates the tendency for the entire financial system to act in a certain way (IMF, 2013a). Individual

reactions by investors can cause panic and amplify losses in the financial sector. Procyclicality is caused by herd behaviour.

The *cross-sectional* dimension reflects common (correlated) exposures which can cause a specific shock to spread and become systemic at any given moment in time. Common exposures arise when institutions have direct exposure to the same or similar asset classes or they have indirect exposures via counterparty relationships (Borio, 2009). The objective of macroprudential tools, in this instance, would be to customise them in accordance with the individual influence on systemic risk as opposed to a microprudential approach, which applies common standards for all institutions that are regulated.

Systemic risk is therefore implicit in the definition of macroprudential policy because it requires macroprudential regulatory intervention. A lack of information is more often than not the main cause of uncertainty in the financial system as the impact of an institution's behaviour on other institutions in the financial system becomes unknown.

Other forms of systemic risk include (i) systemic risk due to "asymmetric" information and (ii) systemic risk due to uncertainty about interest rate policy.

Systemic risk due to *"asymmetric" information*: A lack of accurate information is a key cause of uncertainty, which impacts institutional behaviour in a financial system. Asymmetric information describes situations in which one party to a transaction has better information about the conditions of that transaction than the other party. This often results in the party with superior information taking on riskier projects at the expense of the party with inferior information. From a banking perspective, Marlor (1997:18) states that although institutions have satisfactory information about the business cycle to make rational decisions on the provision of loans, they may not have sufficient information on the behaviour of borrowers. As a result, asymmetric can result in adverse selection and moral hazard.

Adverse selection takes place when high credit risk or lower-quality borrowers are prepared to pay high interest rates for the granting of a loan because they know they might not pay back the loan. These borrowers who are most willing to take up a loan are the most risky ones who are most likely to be selected and provide undesirable or adverse outcomes (Mishkin, 2001).

Moral hazard, on the other hand, takes place after the loan transaction has taken place. The same borrower tends to take on more risk in search for higher profits as he knows he only risks losing a portion of the business that he finances himself as opposed to the loan provider who takes on the bigger loss. Hence, the lender is subjected to the hazard that the borrower might have unethical incentives and might not pay back the loan. Such incentives include undertaking high-risk projects, where the loan provider would bear losses if the project does not succeed. The borrower might also misuse funds, make unfavourable investment decisions or not work hard as he knows that the loan provider would bear losses.

Kirabaeva (2010) states that central bank and government bailouts during financial crises, could also create a moral hazard problem with institutions. Banks are encouraged to take on more risky investments if they anticipate the provision of bailouts if they experience financial stress, thereby threatening financial stability when loans go bad in the event of an economic shock or liquidity crisis.

Mishkin (1990) argues that a possible solution for reducing both adverse selection and moral hazard is to necessitate collateral for the loan, thereby ensuring that the borrower would bear higher costs in the event of him defaulting on a loan. In this way, when collateral is sold, it can minimize or recover losses. It can be argued that in the crisis, securitisation was responsible for bringing asymmetries to financial markets due to their complex nature and lack of transparency which made it difficult for investors to evaluate risks. As a result, as soon as doubts about the safety of the securitised assets arose, these risks became systemic in nature leading to dysfunctional interbank markets as financial institutions lost confidence in each other. Central banks intervened by providing banks with liquidity on extraordinary terms and at longer maturities and also provided liquidity to selected credit markets to stabilise secondary markets.

Systemic risk due to *uncertainty about interest rate policy*: Uncertainty about monetary policy and inflation prospects creates uncertainty about an institution's projected returns due to the difficulty in interpreting information about future developments in consumer prices and interest rates. Altubas et al (2011) state that monetary policy affects bank risk through a number of key ways such as valuations, incomes, cash flows and increased search for yield. Valuations risk refers to the level of uncertainty that financial institutions have about the returns on a specific asset, particularly when the asset is complex and difficult to evaluate. Such assets include subprime loans and structured finance products.

If financial institutions expect a lowering in interest rates, they would possibly relax their credit standards and increase their interest rate exposure, which would result in an increase in the prices and collateral values of their balance sheet assets and accompanied decline in volatility, which would typically reduce the probability of default of those assets. The use of collateral, again, is important to reduce asymmetric information because a borrower would not want to take excessive risks as he could lose his collateral (Marlor, 1997). It is important that communication policies of central banks are open and transparent so that financial institutions' perceptions of inflation expectations and interest rate outcomes lower the expectations of large downside risks.

Monetary policy also influences investors' search for yield. Expectations of lower interest rates can result in financial institutions taking on more risk. Investors typically use short-term returns as a way of assessing institutions' competence levels by encouraging them to shift risks and increase their exposure to high yielding assets during periods of low interest rates. This can have negative implications for institutions when conditions deteriorate and result in herd behaviour.

Hence, the key objective of macroprudential policy is to maintain the stability of the financial system as a whole, by mitigating systemic risk. The focus should be on the financial system in its entirety, rather than individual institutions and

idiosyncratic risks, which are the focus of attention of microprudential policy. It is important that regulators apply their knowledge of the origins of systemic risk and the possible implications for the wider financial system and real economy when designing macroprudential policy and governance frameworks (Trichet, 2009).

3.4 KEY PROPERTIES IN THE DESIGN OF A MACROPRUDENTIAL POLICY FRAMEWORK

The IMF (2011b) and Farrell (2015) suggest that a macroprudential policy framework should be designed according to key elements. These include: (i) having a clear policy mandate; (ii) having processes in place to identify systemic risk in the financial system; (iii) having adequate control over a macroprudential toolkit to mitigate risks and prevent them from becoming systemic in nature and; (iv) having a macroprudential policy institutional design that takes into accountability, governance and co-ordination between different policy objectives. These elements will be discussed in order.

3.4.1 A clear mandate

A macroprudential supervisor should have a clear financial stability mandate, that is, the institution's macroprudential objectives and responsibilities as well as its functions and authority should be clearly outlined. In addition, the objectives must be concise, precise, attainable and measurable (Banque de France, 2014). The mandate should serve to ensure that the supervisor has a sound understanding of the processes to identify, monitor and mitigate systemic risk in the financial system by using an appropriate set macroprudential tools (Ingves, 2011). The mandate must also ensure that the supervisor acts in an independent and transparent manner and is held accountable for the decisions made.

The SARB, for example, has a clear financial stability mandate, which is to assess system-wide financial stability risks, share risk assessments with other agencies and the wider public, contribute towards the development of a macroprudential

toolkit to mitigate risks and recognise that different time horizons warrant different policy decisions when responding to financial stability crises (SARB, 2015d).

The major central banks around the world have also made good progress towards adopting macroprudential mandates (Table 3.1). The Fed, for example, has a primary financial stability mandate set by the Financial Stability Oversight Council (FSOC) to identify financial stability risks, promote market discipline, and respond to emerging threats to the stability of the US financial system (SEC, 2015).

Table 3.1 Macroprudential mandates of key global central banks

Country	**Financial stability mandate**
United States	• Identify and respond to emerging threats to financial stability. • Promote market discipline, eliminate bailout expectations.
European Union	• Prevent or mitigate systemic risks to the EU financial system. • Contribute to smooth functioning of the internal market and sustainable financial sector growth.
United Kingdom	• Protect and enhance the resilience of the UK financial system. • Subject to this, support the government's economic objectives, including growth and employment. • Cannot take actions that would be detrimental to medium-to-long-term growth.
Germany	• Consideration of decisive issues for financial stability • Strengthening co-operation in a crisis between institutions' represented on the Financial Stability Commission.
France	• Maintain the stability of the financial system and guaranteeing that the financial sector makes a sustainable contribution to economic growth. • Ensure co-operation and exchange of information amongst its members.
Switzerland	• Increase the resilience of the banking sector and the overall economy against risks posed by excessive credit growth. • Counter excessive credit growth and price rises.
Sweden	• Discuss both authorities' assessments of systemic risks, appropriate prevention measures and issues relating to the development of macroprudential policy in general.

Source: Bundesbank (2013)

3.4.2 Information and analytical skills

Landau (2009) states that systemic risk can be more easily identified if regulators have a good understanding of institutions' on- and off-balance sheet exposures as well as of the nature of lending and borrowing activities. It is therefore of critical importance that a macroprudential supervisor has access to relevant information that is needed to identify systemic risk. Of equal importance is the need for regulators to have sound analytical skills to assess when and how to utilise these tools in response to the identified risks. In this regard, it would be necessary to combine microeconomic data with aggregate financial system data, particularly from large and complex intermediaries and key markets. For example, macroprudential supervisors should constantly be on the lookout for early-warning signals in current market data.

Large banks in a financial system are susceptible to creating more systemic risk than smaller banks as they typically have lower capital, less stable sources of funding and their activities are mostly market-based. It becomes challenging to identify and measure procyclicality, correlation risk, and concentration risk (Laevan et al. 2014). The 2007 global financial crisis was a good example, where there were a number of triggers that had systemic implications but were not identified by regulators. Such triggers included the change in behaviour of systemically important insurance companies, the build-up of the housing bubble in the US housing market as well as a lack of understanding about the European sovereign debt market.

3.4.3 Adequate control over macroprudential instruments

In order to achieve its macroprudential/financial stability mandate, a macroprudential supervisor should develop and have adequate control over its macroprudential toolkit to reduce systemic risk. These tools need to be broad in scope and be able to operate in the time and cross-sectional dimensions of systemic risk. Mechanisms need to be put in place to deal with the use of these tools, where tensions exist between their use from different policy perspectives.

Therefore, tools should be monitored actively to ascertain their appropriateness. High levels of flexibility are needed to ensure that optimal choices of macroprudential tools are made for country- and context-specifics and that the benefits of using such tools outweigh the costs (Farrell, 2015).

3.4.5 Governance and accountability arrangements and co-ordination of policies

The Banque de France (2014) advocates that the rules of governance, whether established internally or by law, are key factors in determining the success of macroprudential policy in meeting its objectives. In this regard, a macroprudential supervisor has to exhibit characteristics of being independent or autonomous, particularly during periods of economic or financial market stress. A challenge faced in the institutional design of a macroprudential framework is to establish accountability, particularly when there are no easy measures of success (FSB et al., 2011).

The urgent need for macroprudential policy has emerged from a backdrop of only limited experience (Visco, 2011). The difficulties faced in measuring systemic risk has implications for the practical implementation of macroprudential policy as well as the governance and accountability functions of a central bank's macroprudential authority. Accountability and good governance can be strengthened by transparency and clear communication of policy decisions, particularly during times of financial or economic crises.

In this context, the co-ordination of macroprudential and microprudential policies is important, given that most macroprudential tools are microprudential in nature, with the main focus being on individual institutions. If the same tool is used for both micro- and macroprudential purposes, they could be in conflict with each other. Regulators should carefully take into account the impact of these tools as well as the overlaps between the different policy objectives when designing an institutional framework.

3.5 CONCLUSION

The crisis highlighted the urgent need for the reform of the financial system, given the big build-up of leverage and liquidity mismatches that rendered the financial system vulnerable to economic and financial shocks. Macroprudential policy was seen to be the missing factor in pre-crisis policy frameworks. It has been widely accepted that the most recent crisis might have been less costly had financial stability been a clear financial stability mandate in central banks globally. Macroprudential policy is aimed at identifying and mitigating systemic risk in a financial system by preventing the formation of financial imbalances and procyclical phenomena.

In this regard, the implementation of a successful macroprudential framework would entail proper governance through a clear mandate, selection of appropriate tools to mitigate systemic risk as well as a sound understanding of the economy's transmission mechanism to understand the interaction between the different policy objectives of a central bank, notably macroprudential policy and microprudential policy. These factors have been identified as the key elements in the design of a central bank's macroprudential framework to mitigate systemic risk and preserve financial system stability.

CHAPTER 4

DIFFERENT TYPES OF MACROPRUDENTIAL INSTRUMENTS AND THE INTERACTION BETWEEN MONETARY POLICY AND FINANCIAL STABILITY

4.1 INTRODUCTION

One of the key lessons learnt from the crisis was that macroprudential policies are needed to lessen the build-up of systemic risk so as to prevent financial instability. Although microprudential policy can contribute to financial stability, it cannot alone guarantee it. Macroprudential policy is needed to expand the existing prudential framework to enhance financial system stability through the application of macroprudential instruments (MPIs). MPIs are meant to respond to developments in the financial cycle to either mitigate the financial cycle or improve the economy's resilience to it. In general terms, the objective of macroprudential policy is to establish a more robust and less procyclical financial system that promotes balanced and sustainable economic growth (FSB, 2009a).

Because there is no single instrument that influences the behaviour of all financial institution's consistently, a range of MPIs is needed. Such MPIs vary from cyclical capital adequacy requirements, loan-to-value caps, taxes/levies to constraints on the composition of assets and liabilities of financial institutions. Some of these instruments were used for monetary policy objectives (in previous financial crises), mainly by central banks in advanced economies. Emerging markets had already been proactive since the 1990s, having used some of these instruments for macroprudential purposes too, particularly dynamic loan provisioning and reserve requirements (Tovar et al. 2012).

Hence, MPIs could be used to address the threats of financial imbalances that conventional monetary policy (that is, interest rate policy) on its own could not achieve. It is critical that both these policies complement each other and interact in a way that enhances macroeconomic stability and not weaken the effectiveness of each other's objectives.

This chapter aims to provide a review of different types of MPIs as well as cross-country experiences in choosing and applying these instruments. The interaction between monetary policy and macroprudential policy and the implications for central bank policy are also discussed. Finally, the institutional design of the SARB will be examined, taking into consideration the dual mandates of price stability and financial stability.

4.2 TYPES OF MACROPRUDENTIAL INSTRUMENTS AND COUNTRY EXPERIENCES

The IMF (2011a: p8) distinguishes between three categories of measures, namely, credit-related measures, liquidity-related measures and capital-related measures. The various MPIs resorting under each of these three categories are discussed below.

4.2.1 Credit-related measures

(a) Loan-to-value (LTV), loan-to-income (LTI) and debt-to-income (DTI) ratios

LTV, LTI and DTI ratios are collectively known as sustainability-related MPIs, which are typically aimed at putting ceilings on mortgage lending. The LTV ceiling does so by setting a limit on the proportion of the value of the property which households can finance with debt, which means that it requires households to pay a minimum deposit relative to the value of the property. The LTI ceiling restricts mortgage lending to a multiple of the borrower's gross income before tax and other deductions. Similarly, the DTI ceiling restricts mortgage lending by setting a limit on the proportion of the borrower's monthly income that can be devoted to debt servicing payments on all his or her debts. A lower LTV assists in limiting the risk for banks. LTI and DTI caps are intended to reduce the risk of default by borrowers as well as ensure that borrowers can afford to service their debt on a sustainable basis. These measures are important because mortgage lending makes up an important part of total bank lending, particularly in South Africa.

The objective of LTV limits is to protect lending banks against a sharp decline in property prices by reducing the losses in the event of a loan default and the resultant forced sale of the property. According to the Central Bank of Ireland (2014), restrictions on LTV ratios may not have prevented the housing bubble in Ireland but would have mitigated it by reducing the demand for housing and hence lowering house price increases and the potential profits for home developers. This would have resulted in fewer houses being built and a smaller inventory of unsold properties when the housing price crash materialised.

However, a shortcoming of LTV ratios is that they do not entirely eliminate procyclicality, because the capped loan values also increase as property prices rise. LTV caps are considered more effective when used in combination with ceilings on LTI ratios. LTI ratios place a ceiling on the size of a mortgage loan relative to a borrower's gross income, thereby protecting a borrower against excessive repayment burdens and increases in household debt. However, a disadvantage of LTIs is that they are not an accurate measure of average income over the life of the mortgage or of the risk of unemployment and could result in borrowers taking on more secured and unsecured debt than what is prudent. This problem is somewhat mitigated by applying an additional ceiling on households' total debt, namely that imposed by the DTI ratio. This ratio ensures that all types of debt are taken into account when borrowers apply for a mortgage loan.

Therefore a combination of LTV, LTI and DTI ratios should go a long way in addressing procyclicality in the property sector, particularly when household indebtedness rises faster than personal incomes as a result of housing prices rising faster than GDP. In short, LTV ratios address the potential loss to a lending bank when a borrower defaults on a loan, while LTI and DTI ratios deal with the affordability level of borrowers.

Table 4.1 reflects the countries that use LTV and DTI ratios to restrict the granting of mortgage loans.

Table 4.1 Countries that use LTV and DTI ratios to restrict the granting of mortgage loans

MPI	Advanced economies	Emerging market economies
Caps on LTV ratio	Canada (2008), Finland (2010), Hong Kong (1991), Israel (2012), Korea (2002), Norway (2010), Netherlands (2011), Singapore (1996), Sweden (2010)	Bulgaria (2004), Chile (2009), China (2001), India (2010), Indonesia (2012), Latvia (2007), Lebanon (2008), Malaysia (2010), Hungary (2010), Poland (2011), Romania (2004), Serbia (2004), Thailand (2003), Turkey (2011)
Caps on DTI ratio	Canada (2008), Hong Kong (2010), Netherlands (2007), Norway (2010), Singapore (2013)	Columbia (1999), Hungary (2010), Latvia (2007), Malaysia (2011), Poland (2010), Romania (2004), Serbia (2004), Thailand (2004)

Source: IMF (2013b)

In the wake of the global financial crisis of 2007-2009, many advanced economies and emerging market countries such as Hungary and Norway started adopting LTV and DTI measures. However, these measures had already been in use for some time prior to the subprime crisis by countries such as Hong Kong (LTV and DTI caps since the 1990s), Korea (caps on LTVs in 2002 and DTIs in 2005) and Singapore (LTV caps in 1996) which instituted them in reaction to the East Asian crisis of the late 1990s.

(b) Margins and haircuts on repurchase lending and collateralised securities lending

A repurchase (repo) agreement involves the selling of securities together with an agreement to repurchase the securities, at a specified price at a later date. If the event of a seller defaulting, the purchaser can sell the asset to a third party to compensate him or her for the loss. In this regard, the asset serves as collateral and plays the role of mitigating the credit risk for the purchaser of the asset (Adrian et al., 2013). The main market players on the seller's side are the broker-dealers and leveraged investors such as hedge funds while purchasers of these securities are typically risk-averse in nature and looking for secure investments, for example, central banks, money-mutual funds and international financial institutions.

Collateralised securities lending is a collateralised loan of a security between two parties, subject to a pre-specified loan term, which could typically be a business day, a week, a month, or even open. An open loan, which is the most common, is ongoing until one of the parties decides to discontinue it. This type of lending generally involves a fund which lends to broker-dealers, who ultimately lend again to hedge funds and other market participants for investment strategies (SEC, 2014). This entails a legal written agreement between the fund and the borrower, which can be terminated by either party at any time. Collateral is provided by the borrower to the fund for protection against the risk of default. Termination of the loan requires the fund to return the collateral to the borrower, who thereafter must return the borrowed securities to the fund. The fund generates its income via borrower's fees or from reinvestment of the cash given in collateral by the borrower.

Borrowers of collateralised securities include prime brokerage units, bank or broker/dealer proprietary trading desks and hedge funds. Lenders typically consist of mutual funds and investment companies, insurance companies, endowments and foundations, sovereign wealth funds well as corporate and government pensions. Repo lending and collateralised securities lending are very similar in nature except that securities lending transactions do not necessarily have to always involve an exchange of cash, while repo transactions are limited to cash only (Keane, 2013).

In essence, margins and haircuts could be used to set limits on margining requirements by specifying time-varying mandatory minimum margins or haircuts on secured financing and derivative transactions. A haircut refers to the difference between the value of an asset that is used to secure a loan and the actual amount of the secured loan. In other words, a haircut reflects losses on financial instruments, irrespective of the cause thereof. As such, it is similar to the LTV ratio in mortgage lending. A haircut thus represents the part of the securities which the borrower cannot finance through repos or securities borrowing, and therefore forces it to seek alternative finance – either out of its own resources (equity) or by borrowing from elsewhere. The objective of a haircut is to provide risk cover for a

lender against a fall in the value of the collateral when a borrower is forced to sell the collateral in the event of borrower default.

A margin is somewhat similar to a haircut in that it over-collateralises the lender in a repo or securities lending transaction, or the exposed party in a collateralised derivatives position. However, a key difference between a haircut and margin is that a margin need not necessarily be the cause or measure of a loss and is applicable more to securities lending transactions.

At the time of the failure of Lehman Brothers in 2008, the deterioration in market conditions was exacerbated by large, rapid rises in required margins as lenders panicked in reaction to adverse developments. With rising margins, securities holders had to seek additional finance in order to repay their maturing repos. With alternative finance not available at any reasonable price, they were then forced to offload massive amounts of their securities, which led to fire sales. These fire sales resulted in securities prices being lowered further, which then led to lenders demanding even higher margins and haircuts and resulting in more fire sales (Elliot, 2011). That is how market liquidity and funding liquidity for securities holders dried up very rapidly during the recent crisis, causing them to become both illiquid and insolvent. Kashyap et al. (2011) believed that spikes in haircuts resulting from fire sales could have been avoided if minimum levels were set for haircuts during boom periods.

Regulators have similarly been concerned that changes in haircuts can result in procyclicality (Directorate General for Internal Policies, 2013). The argument made is that, in periods of economic boom and high economic confidence, rising asset prices and healthy competition may encourage financial institutions to narrow haircuts on collateral for new repos. This could result in higher collateral values and larger amounts borrowed, which would eventually lead to unduly high levels of credit extension, thereby creating risks in the financial system. The opposite is also true; during times of an economic downturn, there is a tendency for asset prices to fall as risk aversion rises. Lending financial institutions would then be induced into widening haircuts, thereby resulting in reductions in the amounts lent

and a tightening in credit conditions with the subsequent effect of compromising both the liquidity and the solvency of borrowing institutions.

Already prior to the recent subprime crisis, one of the measures adopted by the US Fed was to set limits on the amount of secured lending by securities brokers to their clients, whereby the brokers were only permitted to lend a certain specified percentage of the value of the stock submitted as collateral by their clients. In the event that the stock price declined too much, securities brokers could make a margin call, requesting more collateral.

Haircuts are designed to limit potential pro-cyclical behaviour, with the objective of slowing down sharp declines in credit lines in relatively subdued market conditions and, conversely, mitigating sharp increases in credit lines in volatile market conditions. In this regard, haircuts should achieve a high level of confidence (at least at a 95th percentile, one-tailed confidence interval) and the maximum expected decline in the market price of the collateral asset (FSB, 2012) over the prescribed period of liquidation before the transaction closes out. The CGFS (2010) also argued that if haircuts can achieve stability during periods of market distress, they can go a long way towards addressing procyclicality in the financial system, by providing more credit loss protection cover in the event of a liquidation of collateral assets.

4.2.2 Liquidity-related measures

(a) Reserve requirements

Many countries, particularly emerging markets, use reserve requirements as a macroprudential tool to address systemic risk in two ways; firstly, to dampen excessive credit growth or the results of capital inflows; and secondly, to provide a liquidity cushion to mitigate a systemic liquidity crisis when needed. Reserve requirements are for banks to hold a certain minimum percentage of their deposits as reserves at a central bank. Examples of countries that used reserve requirements extensively over the years include China, Brazil, Indonesia, India and Korea (Lim et al., 2011).

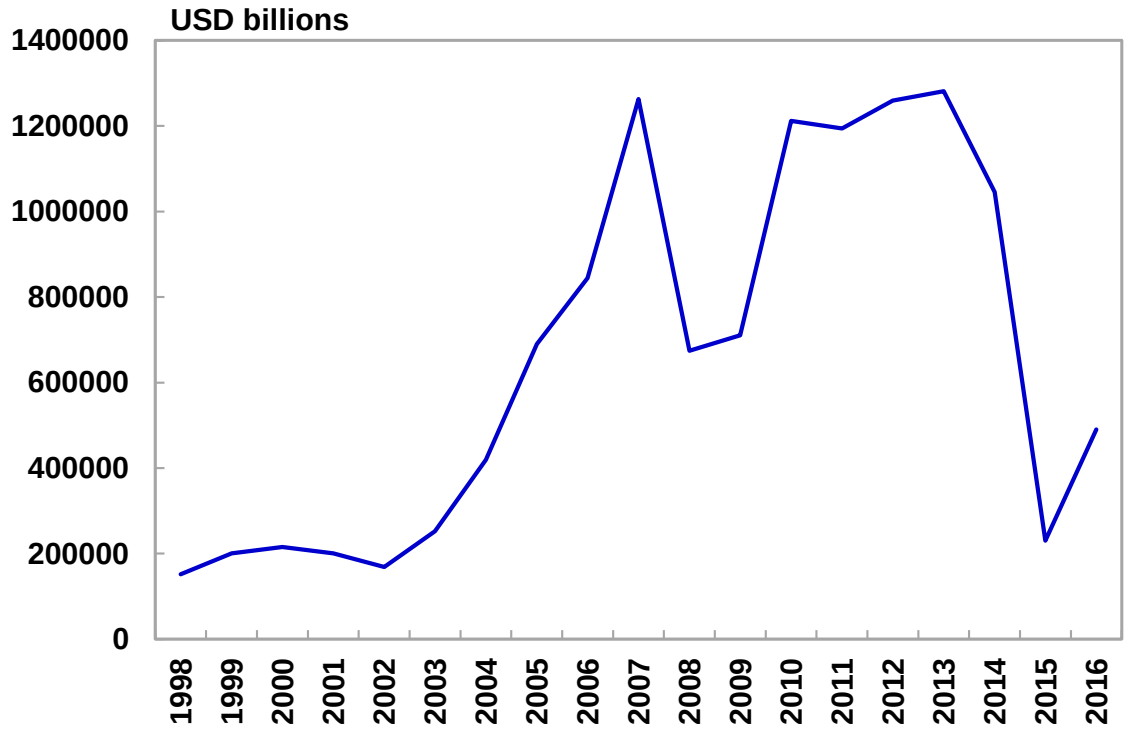
Federico et al. (2012) conducted a study on 52 countries from 1970 to 2012 and concluded that reserve requirements could easily replace monetary policy as a countercyclical tool, given that about 74 per cent of emerging economies use this instrument as a countercyclical tool compared with just 38 per cent in advanced economies. They further argued that reserve requirements are used extensively by emerging markets in place of monetary (interest rate) policy, owing to hesitation on their part to reduce interest rates in stressful economic conditions (in case the currency weakens sharply) or to raise interest rates and attract high levels of capital flows.

Since 2011, China increased its reserve requirements eleven times to curb domestic credit growth and house price growth. In January 2010, Brazil also increased its reserve requirements to reduce credit growth and also introduced a 60 per cent unremunerated reserve requirement on banks' short foreign exchange positions for spot transactions.

(b) Capital controls and constraints on currency mismatches

In the early 2000s and in the run-up to the crisis, capital flows to emerging markets spiralled from USD 139 billion in 2002 to USD 1,2 trillion in 2007 (Ayasan et al. 2014). However, after the US subprime crisis spread into a sovereign debt crisis in Europe and negatively impacted global markets and economies, capital flows to emerging markets fell sharply and were highly volatile, declining to almost half to USD679 billion (See Figure 4.1). The dramatic reversal of capital inflows into emerging markets in the course of 2010 is evidently due to the QE policies of old-world central banks, whereby newly created liquidity spilled over into emerging markets where interest rates were higher. The fall in inflows since the end of 2013 seems a reflection of the tapering off of US QE operations and their eventual ending in 2014.

Figure 4.1 Net private capital flows to emerging markets



Source: Institute of International Finance, Capital Markets Monitor, February 2016.

Capital in- and outflows have a tendency to be strongly procyclical. In this regard, many countries have implemented capital controls as a macroprudential tool to limit systemic risk and protect their financial systems against capital account disruptions. A capital control is a policy that is applied by the resident country and targeted at all non-residents of a country.

Free mobility of capital gives rise to the following difficulties (Haberer and Nowak, 2012):

1. Fear of currency appreciation. When investors expect a currency to appreciate, investment is channelled towards that currency, which exerts more upward pressure on the exchange value of the currency. The stronger a currency, the less competitive domestic manufacturers become in global markets, therefore negatively impacting the real side of the economy.

2. Fear of hot money. Hot money refers to capital flows that move swiftly to countries with higher interest rates or expected currency appreciation as investors gain from short-term higher yields, but move just as swiftly out of countries whose interest rates or exchange rates have fallen and are expected to fall further. In this type of scenario, slight changes to policy rates can have a large impact on exchange rate movements. This is particularly relevant in countries that have deep, liquid markets as money can be easily transferred across accounts and countries. South Africa would be a case in point.

3. Fear of large inflows. The rapid injection of large funds into small markets can cause domestic market dislocations (that is, the build-up of asset price bubbles), undue risk-taking practices amongst domestic cash-flush institutions and further currency appreciation, which would hurt domestic manufacturers' exports. The other risk of easy capital mobility is that when investor sentiment turns negative towards these countries with high interest rate differentials and high-yielding currencies, market inefficiencies can also arise due to a sudden withdrawal of funds by investors, leading to rapid currency depreciation and higher volatility. This phenomenon is also true for the fear of hot money.

4. Fear of loss of monetary autonomy. More often than not, the views of global investors and domestic monetary authorities are not always in alignment with regard to issues such as the exchange rate regime, monetary policy autonomy, and the openness of capital markets. Although having flexible monetary policies would be the desired option to allow market forces to determine prices, it is difficult for central banks to give up their autonomy. Hence central banks would wish to maintain some form of control over capital in- and outflows to stabilise markets due to excessive exchange rate pressures and well as stemming large monetary expansion due to capital inflows. Similarly, regulators would also be looking to impose capital controls to reduce capital flight, particularly caused by investors seeking safe-haven countries during periods of high volatility and uncertainty.

In light of the above-mentioned challenges of capital mobility, it is imperative that capital controls be used as a macroprudential tool to limit excessive capital in- and outflows into and out of a country, as well as to alter the configuration of capital

flows more toward longer maturities and alleviate pressure on real exchange rates. From a country experience perspective, Brazil and Korea are prominent examples of countries that impose capital controls to promote stability.

In Brazil, capital controls have been a key policy initiative to deal with large and volatile capital inflows, in mitigating financial stability risks. Measures deployed by Brazil included higher LTV ratios on foreign-currency denominated loans, a financial transaction tax (a "Tobin tax") on certain types of capital inflows as well as on short US dollar positions held in futures markets, higher reserve requirements on banks' short foreign exchange positions for spot transactions, and foreign-exchange intervention through foreign-exchange swaps. These macroprudential measures were viewed as achieving some success in slowing consumer credit expansion and reducing portfolio inflows and short term borrowing (Tombini, 2013).

During the most recent crisis and the East Asian crisis of the late 1990s, South Korea has been particularly vulnerable to abrupt and disorderly reversals in capital flows. This vulnerability stemmed from a rapid build-up of short-term external debt in prior years, as a result of higher demand for currency forward contracts by the corporate banks who expected currency appreciation (IMF, 2014a). During the recent crisis, four months after the collapse of Lehman Brothers in 2008, South Korea experienced sharp capital outflows (nearly USD70 billion) and volatility was amongst the highest in emerging markets. In August 2011, the country imposed a macroprudential stability levy on banks' non-deposit foreign currency liabilities (with higher penalties on shorter maturities) to further limit large swings in capital flows. Other measures adopted by South Korea included the imposition of limits on foreign currency bank loans and prudential regulations to manage foreign exchange risk in banks. The IMF (2014a) is of the view that the adoption of these macroprudential measures by Korea was somewhat successful in reducing pro-cyclical cross-border lending/borrowing amongst banks.

Many banks have large exposure to foreign currency-denominated lending or borrowing, and face the risk of a currency mismatch when they themselves or their borrowers are unable to repay their debt during periods of sharp depreciations of

the local or relevant foreign currencies. To mitigate this type of risk, countries deploy macroprudential measures such as direct caps on foreign currency exposures, DTI caps by currency, targeted restrictions on foreign currency lending/borrowing and outright bans – to limit growth in unhedged foreign currency lending/borrowing as well as to provide capital buffers during stressful economic conditions. Other measures include LTV caps, higher risk weights and higher capital provisions against foreign loans (IMF, 2011). Hungary and Ukraine are examples of countries that have adopted such measures. However, these countries still have large net outstanding foreign exchange obligations.

c) Liquidity and funding ratios

These include: (1) the liquidity coverage ratio (LCR); and (2) the net stable funding ratio (NSFR) (Bundesbank, 2013). This section will also discuss South Africa's experiences and challenges in this regard.

1. The liquidity coverage ratio (LCR)

The objective of the LCR is to ensure that banks have sufficient levels of high-quality liquid assets (HQLA) to absorb short-term liquidity inefficiencies in the financial system, the interbank market in particular. Basel III regulation requires banks to hold adequate HQLA or other assets such as Treasury bonds that can be converted into cash at short notice (at the central bank or at fellow banks), to cover their net cash needs over a 30-day period under stressed conditions (BIS, 2013).

The LCR is calculated as: Stock of HQLA/Total net cash outflows over the next 30 calendar days x 100 per cent.

In other words, if the LCR is set at 100 per cent, it requires that banks have sufficient HQLA to cover their cash needs over the next 30 days under a stress scenario prescribed by Basel III regulation. For these assets to qualify as HQLA in stress conditions, they should be liquid during times of market stress and eligible as collateral for a central bank.

The LCR was implemented fairly quickly, with reporting having started on 1 January 2015 and full compliance required by 1 January 2019 (see Appendix 1 for implementation deadlines for Basel III regulation). Between 1 January 2015 and 1 January 2019, banks have been required to do stress tests to ascertain liquidity levels that must be held above the minimum requirements. The minimum requirement was set at 60 per cent on 1 January 2015, with 10 per cent annual increases to achieve 100 per cent compliance by 1 January 2019 (SARB, 2013b)

The LCR requires banks to hold an adequate amount of unencumbered HQLA that can be converted easily and immediately into cash. Under Basel III requirements, banks are required to demonstrate that their daily LCR ratio, (that is HQLA divided by total net cash outflows over a specified 30-day period under a prescribed stress scenario), is always greater than the minimum requirement (starting at 60 per cent in 2015 and increasing by 10 per cent increments to 100 per cent in 2019).

The LCR divides eligible assets into Level 1, Level 2A and Level 2B, a new bucket that includes various assets not previously eligible for Level 2, including certain residential mortgage backed securities (RMB), lower rated corporate debt securities (including commercial paper), and common equity.

Level 1 assets, which are of the highest quality and the most liquid, consist of vault cash, reserves held as deposits with the central bank, and certain marketable securities backed by sovereigns and central banks. Banks are not limited in the extent to which they can hold these assets to meet the LCR. Level 2A assets consist of lower rated government securities, covered bonds and corporate debt securities, while Level 2B assets comprise lower-rated corporate bonds, residential MBSs and equities that meet specific conditions. On a total aggregate level, Level 2A assets are not permitted to account for more than 40 per cent of a bank’s total of HQLA, while Level 2B assets are not permitted to account for more than 15 per cent of a bank’s total amount of HQLA.

Banks should be in a position to alert regulators on factors that contribute to their LCR falling below 100 per cent and what measures it intends to implement to cover any shortfalls. During periods of stressed market conditions, however, banks are allowed to use their HQLA, with the result that their LCR ratio falls below the minimum level of 100 per cent.

(2) Net stable funding ratio (NSFR)

The crisis highlighted major liquidity problems in the global banking system. As a result, liquidity requirements were prescribed by the BCBS (2014b) to focus on the 30-day LCR and the NSFR, which had a longer-term liquidity impact. Contrary to the LCR which was implemented fairly quickly on 1 January 2015, the NSFR has proven to be more difficult for the international banking community achieve. The NSFR requirements were first outlined in discussion documents released by the Basel Committee on Banking Supervision (BCBS) in December 2009. After aligning definitions between the two requirements, the final version of NSFR was released in October 2014 and will become a minimum standard by January 2018.

The BCBS (2014b) states that a key objective of the NSFR is to complement the LCR by encouraging banks to choose asset and liability structures that are stable and have financially sound risk management practices. The NSFR is intended to ensure that a bank holds a minimum acceptable amount of stable funding relative to the liquidity features of its assets and other liabilities over a year. It is imperative that a bank captures balance sheet and off-balance sheet items and funds them with more stable sources. In essence, under the NSFR, a bank must reduce its reliance on short-term wholesale funding in favour of more stable deposit funding, thereby minimising the risk of sudden termination of roll-overs and providing support to the banks as a going concern for at least one year if funding pressures arise in the financial system.

Formally, the NSFR is defined as the ratio of a bank's available stable funding (capital and liabilities) to the required stable funding (calculated as a weighted sum of asset and off-balance sheet exposures of the bank) over a one-year period.

The NSFR is calculated as: *(*Available stable funding /Required stable funding) ≥ 100 per cent

According to BCBS (2014b), the NSFR must be standardised to reflect the stability of liabilities across the following two key measurements:

1. *Funding tenor*. The NSFR assumes that longer-term liabilities are more stable than short-term liabilities; and

2. *Funding type and counterparty*. The NSFR is designed under the assumption that short-term deposits (maturing in less than one year) are relatively more stable than short-term wholesale funding, the assumption being that the proportion of the public's total money holdings which it desires to keep as bank deposits remains fairly stable over time, although the public may still shift its deposits from one bank to another.

The Available Stable Funding (ASF), the numerator in the above formula, is the amount of funding a bank can consider relatively stable, based on the source of funding, its contractual maturity and assumptions about the behaviour of different funding providers. ASF is the portion of a bank's funding structure that is reliable over a one year time horizon. ASF is calculated by assigning the carrying value of capital and liabilities to one of five categories and then multiplying it by the ASF factor (ranging between 100 per cent and 0 per cent). The total ASF amount is therefore a weighted average of the amounts in each category. A higher ASF weight is attached to more stable funding.

Required Stable Funding (RSF), the denominator in the above formula, is the amount of stable funding required for on- and off-balance sheet exposures, based on supervisory assumptions about the liquidity risk profile of the assets. The RSF is calculated by assigning the carrying values of various assets into one of eight categories, multiplying by an appropriate RSF factor (ranging between 100 per cent and 0 per cent), and arriving at a weighted average. Liquid assets receive lower RSF factors, while illiquid assets are assigned higher RSF factors.

The actions that banks need to take to meet the NSFR requirements are potentially on both sides of the balance sheet, although the focus post-crisis has shifted to the capital and liability side. While the BCBS (2014b) acknowledges that banks' primary economic roles are liquidity and maturity transformation, the NSFR ultimately aims to reduce transformation risk.

The IMF (2014b) pointed out a few concerns about the impact of the NSFR. The NSFR could prove to be too stringent on banks and result in a slowdown in long-term lending and negatively impact economic growth. As banks compete for funding, it could make deposits less stable, causing risks for the financial system. In addition, the NSFR could channel maturity transformation activities to the unregulated shadow banking sector where systemic risk is more difficult to monitor. These risks are more prevalent in emerging market economies which have less developed capital markets, resulting in a greater reliance on banks for long-term financing.

The NSFR requirements have significant consequences for the credit markets through the impact on banks' balance sheets. The combined effect of these rules is likely to be a significantly higher level of debt issuance by local banks with an incentive to issue longer-dated instruments. Banks holdings' of longer term debt is considered a HQLA asset for collateral purposes.

South Africa's experiences with Basel III regulation (LCR and NSFR)

South African banks are mostly well-positioned to comply with the Basel III requirements for more and better quality capital. However, due to the fact that South Africa has a less liquid corporate bond market and limited access to government debt securities, compliance with the LCR and NFSR has proven to be somewhat challenging (Mminele, 2014).

Table 4.2 lists the liquid assets (Level 1) accepted by the SARB as collateral from South African domestic banks. In terms of Basel III requirements, South Africa has a limited pool of Level 1 assets, and virtually no Level 2 assets.

Table 4.2 Available pool of liquid assets accepted by the SARB (Level 1)

Government bonds (Rand denominated)
Separate Trading of Registered Interest and Principal of Securities (STRIPS)
South African Reserve Bank debentures
Treasury bills

Source: South African Reserve Bank

In light of the above-mentioned challenges, the SARB implemented a collateralised Committed Liquidity Facility (CLF) in January 2013, two years before the Basel III implementation date, to assist domestic banks to meet some of the requirements of the LCR ahead of full compliance of the LCR on 1 January 2019 (SARB, 2013b). The CLF requires that banks meet the Level 1 requirement of the LCR individually. Hence, the CLF should only be used to substitute Level 2 assets and is capped at 40 per cent of the total amount of HQLA that a bank must hold in domestic currency (rand-denominated) terms.

In the South African banking sector, there are structural constraints that make it difficult for banks to meet the new liquidity requirements. About 60 per cent of bank deposits are traditionally wholesale funding from non-bank financial institutions and South Africa has a small retail deposit base (IMF, 2015b). Furthermore, the average funding maturity of assets has been reduced in recent years, providing an even bigger challenge for South African banks to meet the requirements of the NSFR, which requires more retail funding with maturity in excess of one year.

Since South African banks rely more on wholesale funding than retail deposits, the availability of HQLA is expected to pose a challenge for these banks to meet Basel III liquidity requirements, particularly the NSFR. This is largely owing to the fact that the NSFR requires banks to reduce their reliance on short-term (unstable) wholesale funding in favour of more stable deposit funding (discussed earlier), with the objective of providing assistance to banks as a going concern for at least one year in the event of funding pressures in the financial system.

The challenges facing South Africa to comply with the LCR and NSFR can be summarised as follows:

The deposit scarcity. The NFSR rules emphasise deposits, but South Africa suffers from a longstanding lack of adequate household savings.

The reliance on wholesale funding. The use of wholesale funding is actively discouraged by the NSFR rules. Banks are therefore forced to compete for retail and non-financial corporate term deposits as well as operational deposits. The NSFR is likely to have a significant negative impact on banking in countries that have concentrated financial industries and underdeveloped capital markets such as South Africa. One positive impact the rules might have is to accelerate the development of the local capital market. For example, covered bonds might be back on the local regulatory agenda.

Availability of assets. The availability of high quality liquid assets will continue to be challenging for a while because of structural constraints mentioned above.

4.2.3 Capital-related measures

(a) Countercyclical capital buffers, leverage ratios and capital add-ons for global systemically important banks (SIBs).

Subsequent to the financial crisis, global policymakers were forced to step up their efforts towards adopting a macroprudential approach to financial stability for mitigating systemic risk and increasing the ability of SIBs to absorb financial losses. Out of these efforts, the Basel III framework was born in December 2010, with the introduction of the countercyclical capital buffer (CCB), the leverage ratio (LR) and capital add-ons for global systemically important banks (G-SIBs), all of which aimed to build up capital buffers in periods of good economic times to be used in times of stressful market conditions or economic downturns. The Riksbank (2012) states that, to the extent that systemic risks change over time, it also becomes necessary for capital requirements to vary over time.

Countercyclical capital buffer

The intention of the CCB is to protect banks against procyclicality by containing excessive credit growth and the build-up of asset price bubbles during the upturn. In the event that the bubble bursts during the downturn, banks would be in fairly good standing to withstand capital shocks and avert a credit crunch. According to Basel III regulations (BCBS, 2010), the CCB is made up of common equity Tier 1 capital[11] and the additional buffer ranges from 0 to 2,5 per cent of risk-weighted assets. However, regulators are permitted to implement a buffer in excess of 2,5 per cent in line with national policy. The CCB regime is to be phased in between 1 January 2016 and 31 December 2018, and become fully effective on 1 January 2019.

Borio and Lowe (2002a) are of the view that the credit gap is one of the most effective early warning signals for banking crises. If the credit gap is calculated as a large positive ratio, it implies that credit extension at that point in time is well above its long-term trend and could have risen excessively relative to the country's GDP.

One way of increasing the CCB and allowing a bank to absorb losses during an economic downturn is to assign risk weights to individual asset classes, thereby varying the capital buffer required for these assets. An increase in risk weights results in an increase in interest rates on loans such as mortgage loans, secured consumer credit, unsecured consumer credit, and corporate loans. Whilst the marginal cost of funding can rise as sectoral risk weights are assigned to different asset classes, there is also the potential to limit exposure for these asset classes, thereby limiting system risk and promoting financial stability (Elliot, 2011).

The IMF (2013b) cites two examples of countries that have implemented the CCB, namely, the United Kingdom and Switzerland. In the United Kingdom, the Financial Policy Committee (FPC) has been assigned with the responsibility of

[11] Tier 1 capital measures the financial strength of banks, because it is the capital that absorbs losses. Tier 1 capital consists of core capital that is defined by common stock and disclosed reserves (or retained earnings), and also includes non-redeemable, non-cumulative preferred stock.

applying the CCB to banks. The FPC has to review the country's core MPIs as well as decide on when to use the CCB and other MPIs. Some of the United Kingdom's core MPIs include the capital ratio, the leverage ratio, the credit-to-GDP ratio and the credit/GDP trend gap.

Switzerland is another example of a country that recently implemented a CCB in February 2013, owing to concerns about the risk of imbalances in its residential property market. The CCB in Switzerland is required to take the form of common equity Tier 1 capital consisting of a maximum of 2,5 per cent of the risk weighted assets in Switzerland. Banks are also expected to adhere to the additional capital requirement of 1,0 per cent of risk-weighted direct and indirect mortgage-backed positions secured by residential property. The Swiss National Bank does regular assessments on property markets to determine whether the CCB should be activated, adjusted or released as well as the implementation period of the CCB.

Leverage ratio

Another measure aimed at mitigating systemic risks in the broader financial system is the leverage ratio (LR). LR is calculated as the ratio of Tier 1 capital to the sum of all on and off-balance sheet asset items. The objective of LR is to place a limit on the maximum extent to which a bank can leverage its equity to contain the risk of a build-up of excessive debt in the financial system (IMF, 2011a).

In the aftermath of the global financial crisis, the Basel III framework introduced a non-risk based leverage ratio to complement current risk-based capital requirements and safeguard the capturing of both on- and off-balance sheet sources of banks' leverage (BCBS, 2014). The objective of the leverage ratio is two-fold, firstly, to limit the build-up of leverage in the banking sector as a way of preventing the subsequent deleveraging from destabilising the financial system and broader economy and, secondly, to support the risk-based requirements with a simple, transparent non-risk based "backstop" measure.

The Basel III LR is calculated as the capital measure (the numerator) divided by the exposure measure (the denominator), with this ratio expressed as a percentage:

LR = capital measure/exposure measure x 100 per cent

where,

(i) the capital measure used for the LR is the total regulatory capital that is applying at that time under the risk-based framework and;

(ii) the exposure measure for the LR is the accounting value of assets, including on-balance sheet and non-derivative exposures net of specific provisions or accounting valuation adjustments (Office of the Superintendent of Financial Institutions, 2014).

The implementation of the Basel III leverage ratio requirement began on 1 January 2013, where banks reported to national regulators on the LR and its components. The BCBS will continue to monitor country progress, by testing the minimum requirement of 3 per cent for the leverage ratio until 1 January 2017. Final calibration of the LR and any further adjustments are expected to be completed by 2017, with a view to moving over to Pillar 1 (that is, the minimum capital requirement) on 1 January 2018. Countries that have started using leverage ratios include the United States, Canada and Switzerland (World Bank, 2009).

Capital add-ons for globally systemically important banks

In November 2014, the FSB tabled a proposal for capital add-ons or additional loss-absorbing capacity (ALAC) for G-SIBs in order to protect taxpayers against having to cover bank losses in the case of bank failure (G20, 2014). ALAC for G-SIBS required that banks' total loss absorbency capital (TLAC) (Pillar 1) should increase significantly above the minimums set by Basel III regulation (that is, within 16 per cent to 20 per cent of risk-weighted assets) and at a minimum of

twice the Basel III leverage requirement. In other words, G-SIBs were required to hold at least twice the minimum Basel III total regulatory capital ratio of 8 per cent and at least twice the global Basel III leverage ratio of 3 per cent. An important aspect of his tool is that it addresses the cross-sectional aspect of systemic risk whereas previous MPIs addressed the time-varying (procyclicality) aspect of it.

Another requirement imposed was that TLAC also include a subjective component (called “Pillar 2”) which would be based on qualitative bank-specific risks that specifically take a bank’s recovery and resolution plans as well as its risk profile into account. Each bank would be individually assessed on these criteria (Price Waterhouse Coopers, 2014).

From a South African point of view, the FSBs proposals relating to G-SIBs are quite relevant, given that two of the five major banks in South Africa are directly affected. Barclays Plc and Industrial and Commercial Bank of China (ICBC) are recognised as G-SIBs. Barclays Plc is the parent of ABSA/Barclays and ICBC has a significant shareholding in Standard Bank. Essentially, G-SIB regulations ultimately become rules for domestic systemically important banks (D-SIBs). South Africa is likely to start applying these rules by 1 January 2019.

b) Dynamic loan loss provisioning

Dynamic provisioning is identified as a macroprudential instrument that can be used to promote bank soundness by mitigating procyclicality in the financial system (Wezel et al., 2012). In simple terms, dynamic loan provisioning is a measure to ensure that financial institutions are not negatively affected by rising losses at the very time that banks are required to support weak economic growth through their lending standards. Given that there is a higher default rate on loans during periods of slow credit growth than rapid credit growth, it is important that banks increase their loan loss provisioning during times of rapid credit growth so that they can absorb the loan losses during times of slow credit growth.

During the 2007-2009 global financial crisis, there was limited focus on the role of loan loss provisioning as a way to address procyclicality of capital requirements

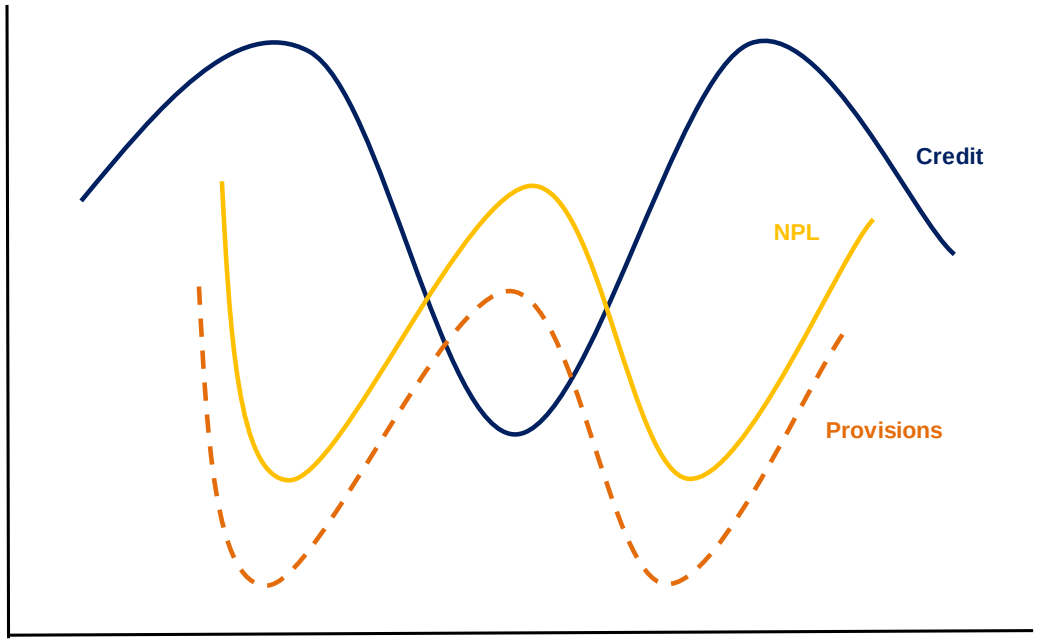
and this was seen as a major source of financial system instability. According to Fillat and Montoriol-Garriga (2010), this neglect was quite surprising given the important role that loan loss provisioning plays in covering expected losses and the role of capital in providing an adequate buffer for unexpected losses. However, there were some countries that proactively adopted dynamic provisioning in the run up to and during the crisis. One such country that took the lead with dynamic provisioning was Spain, while others such as Uruguay, Colombia, Peru, Bolivia, Mexico and Chile followed suite.

Dynamic provisioning in the Spanish banking sector was first implemented by the Banco de España in July 2000, owing to strong procyclicality in bank lending. Against a backdrop of strong competition in the Spanish banking sector, low levels of non-performing loans and volatile asset price swings, banks eased their credit criteria during the boom of the 1990s. Credit growth in Spain grew rapidly in the 1990s which resulted in a rapid rise in credit risk on the balance sheet of banks. This contributed to the build-up of financial imbalances in Spain's non-financial sector, which neither monetary policy nor the nominal exchange rate could resolve. In this context, Spain adopted a macroprudential tool called dynamic (statistical) provisions to limit credit growth by increasing the cost of new credit granted and to prevent Spanish banks from incurring further losses and undermining the system as a whole.

In a normal provisioning system, provisions are a function of the incidence of non-performing loans (De Lis and Herrero, 2009). As per Basel I regulation, non-performing loans refer to loans that are overdue for 90 days (SARB, 2011). As credit growth increases during cyclical upturns, GDP growth also increases and debtors can afford to service their debt. Debt provisions are thus low, which results in lower risk aversion feeding back into higher credit and GDP growth. The opposite is also true. As credit growth stagnates during the cyclical downturn, non-performing loans spike causing banks to make higher provisioning which feeds back into lower credit extension and GDP growth, thereby reinforcing the downturn resulting in a pro-cyclical pattern of normal provisions as reflected in Figure 4.2.

Figure 4.2 Normal Loan Provisioning

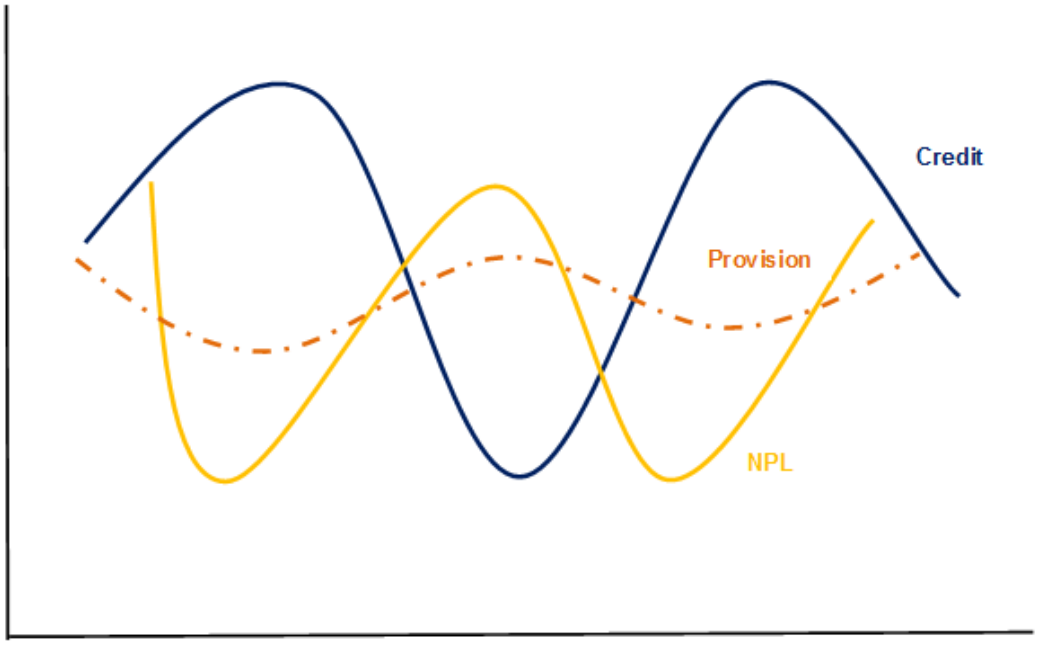
Per cent



Source: De Lis and Herrero (2009)

Figure 4.3 Dynamic loan provisioning

Per cent



Source: De Lis and Herrero (2009)

Dynamic provisioning aims to show provisions with a smoothed pro-cyclical pattern along the cycle, thereby avoiding the pro-cyclical effect of normal provisioning (Figure 4.3).

The introduction of dynamic provisioning led to a slight decrease in credit provision between 1999 and 2001 and a continued declining trend thereafter, in line with GDP growth in Spain. However, procyclicality was not eliminated totally but nonetheless reduced credit growth somewhat during the cyclical upturn. De Lis and Herrero (2009) argued that the lengthened business cycle made it challenging to determine long-run expected losses which were also not systemically tested by the statistical provisioning method. This could possibly explain why dynamic provisioning was unsuccessful at preventing a housing bubble in Spain and at saving Spanish banks from failure in the most recent crisis.

Domestic banks were still able to provide large quantities of loans to risky sectors of the economy (Wezel et al. 2012). In this regard, dynamic provisioning was unsuccessful at taking corrective action and eliminating procyclicality and was viewed as being a reactive measure in stabilising bank profits in an economic downturn and maintaining capital above the required level.

4.3 POLICY APPROACHES AND STRATEGIES IN THE SELECTION OF MACROPRUDENTIAL INSTRUMENTS

According to the BIS (2012), one of the biggest challenges facing policymakers is deciding on how to choose and apply MPIs. The choice of macroprudential instruments is dependent on a country's institutional arrangements, its financial and economic conditions, prevailing law and market practices as well as the types of systemic risks that exist in the financial system.

The G30 (2010) states that regulators mostly rely on identifying the stage of a financial cycle to determine whether or not to deploy MPIs. The Committee on Global Financial System (CGFS, 2010) proposed a three-step approach for regulators to adopt when selecting and applying MPIs (Table 4.3).

Table 4.3 Steps in the selection of macroprudential instruments

Step 1	Determine the following in respect of the MPI: • applicability to the MPI; • ease of data availability and • ability to easily communicate and replicate.
Step 2	Strictly assess the reliability of possible indicators to guide the build-up or activation of specific MPIs.
Step 3	Determine whether the stage of the financial cycle is a mere downturn or the precursor to a crisis, which will determine whether to activate a gradual or quick release of MPIs.

Source: G30 (2010)

According to Kama and Adigun (2013), an effective MPI relies on the observation of some sort of trend prior to a crisis, which provides an early warning signal about the build-up of financial imbalances. The relevant diagnostic tool or indicator should also provide guidance on when to implement the relevant MPI, depending on the stage of the financial cycle, that is, whether it concerns a relatively harmless economic downturn or an impending crisis.

Similarly, the BIS (2012) argues that the ability to identify and measure systemic risks and vulnerabilities is a key factor for successfully implementing MPIs, because if MPIs are applied at the wrong time, it can result in failure to achieve macroprudential objectives, which affects the costs associated with the activation of these MPIs. A delayed activation of MPIs can result in them having less impact because there might not be enough time to achieve the desired results.

The IMF (2011a) states that whilst “no size fits all”, there are some MPI strategies that are inherently more advantageous than others. For example, using multiple MPIs is inherently more effective in addressing different aspects of the same risk than using just one MPI. In many instances, it is also intrinsically more beneficial to target specific risks than broad risks as it becomes easier to differentiate between different types of transactions within a targeted risk.

Quagliariello and Libertucci (2010) state that the activation or deactivation of MPIs, (particularly countercyclical tools such as capital buffers) can be rules-based or follow a discretionary approach. Under a rules-based approach, MPIs must contain forward-looking information on an actual risk situation that is linked to the dynamics of predefined macroeconomic or financial variables. In other words, policy reaction would depend on how regulators identify micro and macroeconomic objectives. Under a discretion-based approach, regulators would want banks to build-up buffers during periods of economic booms. Under this approach, regulators should be able to confidently declare that an economic boom is taking place and is the cause of excessive risk-taking. On a case-by-case assessment, regulators would use their discretion to impose capital savings on banks for them to use during tough economic times via the release of capital buffers.

According to Elliot (2011), the choice of MPIs is also influenced by the nature of the systemic threat as well as the degree of its uncertainty. The IMF (2011) supports the above-mentioned view and articulates that the more information there is about a systemic risk, the easier it is for regulators to identify the most effective instrument to address potential problems. For example, in order to gain an understanding of aggregate risk in the financial system, it is important for regulators to investigate total credit, liquidity, and market risk, as well as to look at the sectors in which these risks are concentrated, for example, the real-estate sector or consumer household sector.

Parker (2012) suggests that the following questions be considered when examining systemic risk concentration. Is the risk held mainly by households and is it adequately priced? How exposed is consumer demand to price deterioration in different assets or asset classes? What is the probability of private losses becoming public liabilities and how exposed will households be in this regard?

From an international perspective, it is critical that there is cross-border co-ordination of the use of MPIs amongst countries that are interconnected, as credit booms and the build-up of asset price bubbles can be fed by the

provision of international credit lines. Cross-border co-ordination is also necessary in order to control regulatory arbitrage (Kincaid & Watson, 2014)[12].

Regulatory arbitrage becomes more prominent when there is a single currency financial market with limited exchange rate risks. Financial institutions (including their branches) are regulated by their home regulators while host countries regulate their domestic financial institutions (including subsidiaries of foreign financial institutions). As a result, MPIs that are applied by a host country would not necessarily apply to local branches of foreign banks and institutions and households could access credit directly from these branches.

The BCBS (2010a) tried to alleviate this problem by levelling the playing field and establishing the principle of "jurisdictional reciprocity", whereby foreign regulators are obliged to apply the same additional capital buffers on their banks' lending to host country borrowers as the host regulatory authority puts on its own banks. However, this principle applies only to counter-cyclical capital buffers and not to all MPIs. A good example of this type of challenge is in the eurozone where counter-cyclical buffers for large banks fall under the jurisdiction of the ECB (single supervisor), but banks also compete with local capital markets and non-banks for lending which are regulated by national authorities. Therefore MPIs in different Eurozone countries need to be tailor-made in line with systemic risks in each individual economy as well as the broader Eurozone economy.

The high levels of liquidity prevalent in the build-up to the 2007-2009 global financial crisis as well as the QE measures in the aftermath of the crisis gave rise to excessive and volatile cross-border capital flows which has created challenges, particularly for emerging markets. In this regard, it is of great importance that MPIs are used in the correct manner to reduce systemic risks relating to capital in- and outflows. According to the IMF (2011a), MPIs do not differentiate between residents and non-residents while capital controls make that distinction. An

[12] Regulatory arbitrage is where institutions take advantage of weaknesses in regulatory systems to avert certain types of regulation. These institutions usually end up conducting their business operations in locations where regulation is weaker or can more easily be circumvented.

example of this is the CCB that is consistent with the build-up of credit, which is triggered by high levels of credit growth from both resident and non-resident banks.

Asset prices and cross-border credit extension are the key variables affected by cross-border capital flows in most emerging markets, particularly emerging Asia (IMF, 2014c). Excessive capital inflows often result in higher inflation, strong exchange rate appreciation as well as rapid asset price increases and monetary growth which negatively affect financial stability. Hence, MPIs should play a critical role in limiting the growth in cross-border credit extension.

It is of critical importance that MPIs be consistent with other policy goals and that regulators consider their behavioural and cumulative impact on institutions, consumers and other regulatory measures so that intermediation in the economy is not compromised. For example, the implementation of Basel II regulation resulted in banks' changing their behaviour (by using special purpose vehicles to move assets off balance sheet – as explained in Chapter 2) due to different levels of capital charged against instruments held on their balance sheets.

A transparent regulatory and institutional macroprudential framework requires a transparent and effective macroprudential toolkit of instruments that should be applied to most sectors in a financial system. The CGFS (2009) states that macroprudential policy has predominantly focused on judgement-based (discretion) rather than rules-based MPIs, with the objective of promoting resilience in the financial system by moderating financial cycles and curtailing excessive credit growth or prevent excess cross-border capital inflows. Deciding on the stage of financial cycles, however, is challenging and therefore requires that MPIs be varied actively (depending on where systemic risks are emerging from) and calibrated quantitatively.

In summary, MPIs need to capture the build-up of credit risk, act as early warning signals to detect stress in the financial system and be able to ascertain whether the financial system can absorb the risks (Reserve Bank of New Zealand (RBNZ), 2013). In this regard, regulators have a variety of policy instruments at their

disposal, ranging from direct measures which control the availability and price of credit to indirect measures which affect the cost of funding through capital and liquidity requirements.

4.4 WORLDWIDE EXPERIENCES WITH MACROPRUDENTIAL INSTRUMENTS

a) Europe

With regard to MPI's used in other regions, the European macroprudential framework has improved after the crisis, with stronger prudential requirements (ECB, 2015). EU legislation which previously consisted of the Capital Requirements Directive (CRD IV) and the Capital Requirements Regulation (CRR), proposed a variety of MPIs to all national authorities in the European Monetary Union (EMU) (EBA, 2014). In addition, the establishment of the Single Supervisory Mechanism (SSM) to complement the ECB's microprudential responsibilities resulted in the ECB taking over the supervision of the macroprudential function in the SSM countries.

This change in legislation culminated in the ECB introducing a macroprudential toolkit consisting of capital instruments, such as the CCB, the systemic risk buffer (SRB), capital surcharges of systemically important banks (SIBs) as well as liquidity instruments, such as the LCR, which were designed to minimise structural systemic risk. The SRB is a CRD IV-specific, temporary buffer that applies only at times where excess credit growth needs to be curtailed. The ECB has also imposed higher risk weights on real estate exposures and higher limits on larger exposures.

According to the IMF (2013c), the Basel III CCB is an essential but not a sufficient component of the toolkit, and therefore needs to be combined with other MPIs to address the cross-sectional and time dimension of systemic risk. MPIs have not been used extensively in Europe and most banks have typically relied on non-price criteria to ration the supply of credit or assess the credit worthiness of

borrowers. For example, for many years, the ECB Bank Lending Survey has provided very useful information on price and non-price measures relied upon to tighten credit supply and those factors that affect credit supply. Placing ceilings on LTVs and DTIs in Europe has also been a successful measure of reducing mortgage credit growth or house price appreciation and have complemented the CCB.

b) The US

The macroprudential toolkit of the Fed is presently being developed and tested in the US financial system. According to Brainard (2014), the objective of the Fed's macroprudential surveillance is to develop resilient banks and markets to ensure that risks are mitigated early enough to prevent disruptions to financial stability that could spill over into the real economy.

The US macroprudential framework requires banks to hold sufficient levels of loss-absorbing regulatory capital to enable banks to be more resilient when facing unexpected losses. This is particularly important for large interconnected SIFIs, where capital buffers can prevent spill-over effects into other banks and the broader financial system.

In his regard, the US has made sufficient progress according to Yellen (2014). In addition to the Basel III liquidity requirements of reducing banks' reliance on short-term wholesale funding, the Fed has also adopted its own stress tests and Comprehensive Capital Analysis and Review process, which requires large US banks to maintain adequate capital levels to withstand large and unexpected economic shocks, as well ensure that each bank's internal capital planning processes are effective.

Other macropudential measures aimed at identifying risks in the US wholesale funding market include imposing requirements on SIFIs to hold more and better quality capital, to have more stable sources of funding, and to maintain minimum margins for repurchase agreements. The Financial Stability Oversight Council which supervises non-bank financial institutions is now responsible for the

strengthening of the oversight of the US shadow banking system. However, the Fed has not progressed well in developing time-varying macroprudential tools to limit excessive credit growth during boom periods and is still contemplating ways in which to implement the Basel III CCB measure (Yellen, 2014).

c) The world as a whole

The IMF (2014a) conducted a survey on the overall use of MPIs and it became evident that 42 countries (28 emerging markets and 14 advanced economies) applied at least one MPI once between the period 2000-2013, while 23 countries in the survey did not implement any MPIs. According to the IMF, it made sense that emerging markets made more use of MPIs, due to their large exposures to external shocks and higher market failures.

Table 4.4 Overall usage of MPIs by emerging markets and advanced economies

Instrument	Total countries	Frequency of use	Emerging markets	Advanced economies	Frequency emerging markets per year	Frequency advanced economies per year
Loan-to-value	24	28%	13	11	20%	55%
Debt-to-income	23	24%	16	7	25%	20%
Limits on credit growth	6	9%	6	0	12%	0%
Limits on foreign lending	15	14%	12	3	14%	15%
Reserve requirements	10	15%	10	0	20%	0%
Dynamic provisioning	7	8%	6	1	7%	9%
Countercyclical requirements	5	2%	2	3	2%	2%
Total by classification	42	100%	28	14	100%	100%

Source: IMF (2014a)

In terms of the actual usage by country groupings, LTV and DTI ratios are used the most by advanced economies, while other MPIs are seldom used (see Table 4.4). Emerging market economies prefer using foreign exchange and liquidity-related instruments to prevent systemic risk arising out of large and volatile capital

in- and outflows. Interestingly, advanced economies which are more concerned about excessive leverage, have a higher usage of LTVs (55 per cent) and DTIs (20 per cent).

The next section provides an overview of the interaction between macroprudential policy and monetary policy. It is important that policy tools be used in a manner that takes into consideration the possible ill-effects of monetary policy on macroprudential targets, and vice versa.

4.5 THE INTERACTION BETWEEN MONETARY POLICY (MICROPRUDENTIAL) AND FINANCIAL STABILITY (MACRORPDUENTIAL POLICY)

Monetary policy and financial stability should have clear and distinct policy objectives, which need to be coordinated in such a way that they do not frustrate each other and transparency and accountability are maintained. In this regard, it is important that MPIs are used in the appropriate manner to support monetary policy and achieve financial stability objectives.

Angelini et al. (2012) argue that the potential for conflict between both policy objectives is seemingly asymmetric and more likely to arise during economic downturns when a macroprudential supervisor would want to decrease buffers (lower the capital requirement) to prevent a credit crisis. At this stage, a microprudential supervisor would be hesitant to run down buffers as the monetary policy objective would be to protect the safety and soundness of individual banks in the financial system. However, this is not seen as a major concern because in an economic downturn, it might be challenging for a macroprudential supervisor to reduce the capital requirement for banks, largely because banks would be pressured to recapitalise anyway, given deteriorating economic conditions. A possible solution would be to raise buffers during normal economic times (instead of boom periods only) so that reductions in countercyclical policies in bust periods would be less harmful to banks.

The Banque de France (2014) and Chodorow-Reich (2014) point out that the interaction between monetary and macroprudential policies is dependent on the type of supply and demand imbalances in the financial system and their transmission to the wider economy. Another example of conflicting policy objectives is where an asset price bubble has been identified as a financial stability risk but at the same time there are strong deflationary price stability risks. In this scenario, it is argued that macroprudential measures should be used to limit credit and liquidity growth.

However, the downside risk is that limiting credit growth could result in a contraction in economic activity and set a deflationary spiral in motion. So whilst macroprudential policy would meet its financial stability objective, there could be negative consequences for price stability, requiring a loosening of monetary policy to support economic activity. But then this loosening of monetary policy could exacerbate the asset price bubble and result in more financial imbalances.

4.5.1 The transmission channel between monetary policy and financial stability

The transmission channel between both policies consists of two links namely; the link between interest rates and key financial variables and, secondly; the link between these financial variables and the probability of large and disorderly macroeconomic disturbances.

In the short term, tighter monetary policy (higher interest rates) is likely to reduce household aggregate demand, thereby reducing household and bank's earnings and profitability. In the medium term, however, the IMF (2013d) suggests that the weakening effect of higher interest rates on financial stability could reverse as these financial intermediaries adjust their balance sheets and behaviour in line with expectations of higher interest rates.

The IMF (2013d: p11) also identifies the following channels via which monetary policy can affect financial stability, namely, risk-taking practices of financial institutions; borrowing constraints and the probability of default; asset-price and exchange-rate externalities and, the stage of the financial cycle.

Risk-taking practices

In a world of financial market imperfections and asymmetric information, individual institutional behaviour becomes distorted and gets out of control when agents take excessive risks to achieve higher returns. This is particularly evident during prolonged periods of low interest rates and economic booms where incentives are created for banks to overleverage and not screen borrowers in an appropriate manner. Moreover, if monetary policy is expected to remain accommodative during periods of economic contraction, this could give rise to additional incentives for banks to take on more risk, which would be a threat to financial stability as asset price bubbles and imbalances build up (Osinski et al., 2013).

Borrowing constraints and the probability of default

A loosening of monetary policy is characterised by falling interest rates, which result in lower external financing costs and thus encourage credit demand and aggregate spending. However, the opposite is also true. In the event of monetary policy tightening, that is, rising interest rates, the debt-servicing costs increase, thereby having a negative effect on a borrower's ability to repay a loan, and possibly leading to higher levels of debt default and financial instability (Drehmann and Juselius, 2012).

Asset-price and exchange-rate effects

Monetary policy has an influence on asset prices and ultimately exchange rates via the value of collateral which influences borrowing by consumers. As discussed, long periods of low interest rates and the resultant monetary expansion can result in inflated asset prices, which expand the value of collateral and thus encourage banks to provide even more credit, thereby leading to even further asset price increases.

Conversely, the fall in asset prices due to higher interest rates lowers the value of collateral. This, in turn, discourages local borrowing and encourages borrowing from abroad in foreign currency, which leads to capital inflows and results in

appreciating exchange rates. Foreign currency denominated debt thus accumulates. In the event of a disorderly unwinding of these debt positions, the exchange rate could fall precipitously thereby destabilising the financial system.

Stage of the financial cycle

Traditionally speaking, the main variable used to characterise a business cycle is output, while the financial cycle is determined by variables such as credit, property prices and equity prices (Claessens et al. 2011). Financial cycles play a critical role in determining the use of countercyclical macroprudential policy. This is largely due to the fact that financial cycles are self-reinforcing feedback loops within the financial system and between the financial system and real economy (Borio, 2014b).

Financial cycles also play an important role in influencing the duration and strength of economic downturns (or recessions) and economic upswings (or recovery). Economic recessions caused by the bursting of credit and house price bubbles are typically longer and more pronounced than economic recoveries which are modestly shorter in duration and stronger. However, this does not take into account domestic drivers of business cycles (for example financial flows and the trade account) and external factors (such as the global economic outlook and changes in commodity prices) (Claessens et al. 2011).

Borio et al. (2001) also suggests that the financial cycle is a good function of credit volumes and property prices and it appears to be much longer in duration than the business cycle (by about 15 years) and is also more pronounced. The stage of a financial cycle is a critical determinant of when to consider deploying monetary policy or financial stability measures against a backdrop of economic downturns or upturns.

During an upswing of a financial cycle, microprudential indicators would appear to indicate strong levels of credit growth and healthy balance sheets so authorities would analyse banks' credit standards and loan provisioning. Macroprudential authorities, on the other hand, would be monitoring the build-up of systemic risk

and would undertake measures to deploy MPIs such as the CCB, LTVs or other tools that affect credit growth. Borio & Drehmann (2009) refer to this type of scenario as the “paradox of financial instability”, that is, the financial system appears to be at its strongest when it can be at its most vulnerable. Likewise, during an economic downturn, microprudential authorities aim to ensure the stability of the financial system as a whole, while the concern of microprudential authorities is to ensure the stability of individual financial institutions.

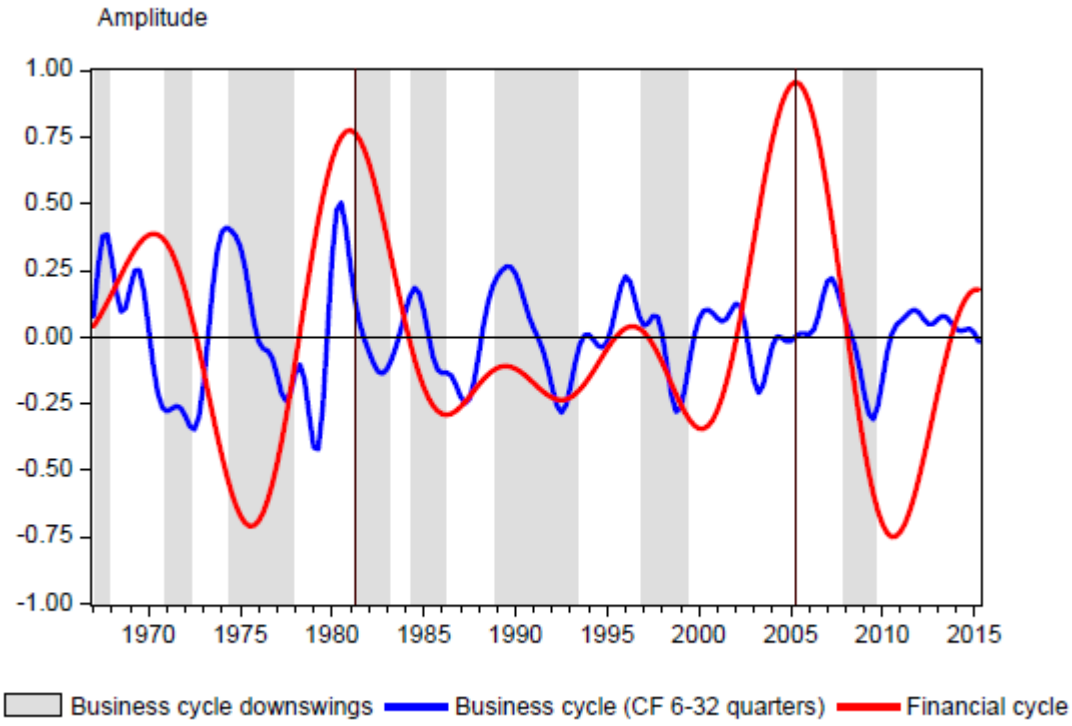
An important consideration is whether the objective of macroprudential policy should be to enhance the resilience of the financial system or whether it should aim to tame the financial cycle by constraining lending booms. Borio (2014b) argues that MPIs do succeed in building resilience in the financial system by increasing capital buffers in boom times to withstand shocks in bust times. However, it is more challenging to tame the financial cycle. Although capital buffers do succeed somewhat in limiting excessive credit and asset price growth, some MPIs are not as effective as others. For example, DTI ratios and LTV ratios possibly achieve more success than increasing loan provisions or capital requirements.

Constâncio (2014) also suggests that macroprudential policy should aim to temper the financial cycle through mitigating systemic risk, rather than just promoting financial system resilience. However, he argues that whilst this is possible through MPIs, it also comes with challenges as it is not just about building buffers but also about assessing exogenous and endogenous risks to financial stability.

Exogenous financial stability risks are external shocks that include a deterioration in market sentiment, oil price shocks, changes in the country’s terms of trade, geopolitical risk, a sovereign credit rating downgrade to a country’s peer, or the failure of a large systemically important bank (Schinasi, 2005). Endogneous risks include accomodative monetary policy (low interest rates) that fuel a credit or asset price boom, resulting in excessive leverage and eventual banking crises.

A comparison of South Africa’s business and financial cycle is depicted in Figure 4.4.

Figure 4.4 South Africa's business and financial cycle



Source: South African Reserve Bank, Financial Stability Review, September 2015.

South Africa's financial cycle is estimated by using financial variables such as total credit, residential house prices and equity prices. According to the SARB (2015b), South Africa's financial cycle has a lower frequency than the business cycle. The peaks of the financial cycle are highly correlated with episodes of financial stress, such as the early 1980s (ahead of the collapse of the gold price), the strong depreciation of the rand (ahead of the debt crisis in 1985) and the build-up to the 2007-2009 global financial crisis.

4.5.2 Should monetary policy have financial stability objectives?

Policymakers and academics are constantly debating the degree to which monetary policy should take into account financial stability objectives. The RBNZ (2014:21-22) argues that there are two opposing views ("clean" and "lean") on whether it is appropriate to tighten monetary policy to enhance financial stability during periods of credit or asset price booms.

The “clean” view proposes that monetary policy should respond to asset price and credit booms only to the extent that they impact on expected inflation outcomes. Bernanke & Gertler (1999) also argue in favour of this view, advocating that the effects of asset price fluctuations on price inflation are too asymmetrical for monetary policy to lean against them. In this sense, macroprudential instruments, rather than monetary policy instruments, should be deployed to minimise losses in the financial system and prevent financial instability by providing early warning signals on future crises. Using the interest rate as a tool to prick asset price bubbles and reduce aggregate demand could create further problems, particularly if central banks find themselves being trapped in providing more liquidity than is needed for long-run price stability. This is specifically relevant in instances of high debt levels after a financial crisis is not resolved (Smets, 2014).

The “lean” view proposes that monetary policy should lean against credit booms for financial stability purposes, even if its main objective remains longer term price stability. In other words, central banks should be incentivised to lean against the building up of asset bubbles ex ante. Higher interest rates can be somewhat effective in limiting an asset price or credit boom without imposing additional costs on the wider economy. In this view, macroprudential instruments, on their own, are not sufficient to mitigate the build-up of systemic risk. The “lean” view is shared by Cecchetti et al. (2000) who argue that allowing the policy instrument to respond to asset prices will most likely reduce the probability of disorderly asset price movements and economic risks. It has also been contended by Borio and Lowe (2002) that monetary policy can respond to financial imbalances via the channel of higher interest rates as they build up.

4.5.3 Institutional design in general

Given the growing importance of macroprudential policy and financial stability on a world-wide level, central banks are facing challenges on institutional design in the context of additional financial stability mandates and how best to manage trade-offs between price stability and financial stability.

Some of the challenges that arise out of the interaction between monetary policy and financial stability may limit the optimal use of macroprudential instruments, which suggests the importance of a high level of co-operation and co-ordination between monetary and macroprudential authorities. When the functions of both monetary policy and financial stability are performed in one central bank, for example the SARB, there might be improved co-ordination of these policy objectives. However, safety measures would still need to be activated to mitigate the risks of having dual mandates (IMF, 2013d). Some of these safety measures include separate decision-making structures for monetary policy and financial stability policies as well as separate accountability and communications structures.

When the functions of monetary policy and financial stability are housed in different institutions, this gives rise to a different set of challenges, particularly where the functions are split between a central bank and the Treasury. For example, in Chile, the Treasury has the responsibility of chairing the Financial Stability Committee while the Central Bank of Chile has an observer status on the same committee (Jacome et al., 2012). Under these circumstances, conflict between both sets of policy objectives could arise with regard to the issue of central bank independence as the central bank might be constrained to participate in the committee or have limited formal powers to apply macroprudential tools. Furthermore, when the central bank implements measures for its price stability mandate (monetary policy), it might be difficult to propose macroprudential tools, given its single mandate of price stability, therefore resulting in challenging co-ordination between the institutions concerned and ineffective management of macroprudential policy.

The next section describes the institutional design of the SARB in consideration of its dual mandates of price stability and financial stability.

4.5.4 Institutional design in South Africa: financial stability mandate

On 27 October 2010, in the aftermath of the 2007-2009 global financial crisis, the South African Ministry of Finance announced that the SARB was given an

expanded mandate to take on the responsibility for financial stability, in addition to its current mandate of price stability. South Africa made a commitment to implement a set of regulatory reforms to make the financial sector safer and better. This was outlined in a document entitled “Implementing a Twin Peaks Model of Financial Regulation in South Africa” (National Treasury, 2013). The Twin-Peaks model reforms were proposed by the Financial Regulatory Reform Steering Committee (FRRSC), whose main objective was to strengthen the regulatory framework in South Africa. In this regard, the SARB was given the new responsibility of a “systemic regulator”, with its role being the development of a macroprudential policy framework.

The Ministry of Finance and the SARB created a joint task team, which included members of the SARB, National Treasury (NT) and the Financial Services Board (FSB) to implement an explicit financial stability mandate within an appropriate macroprudential framework in the SARB, as provided by the Financial Sector Regulation Bill, 2015 (FSR Bill). Additionally, the FSR Bill provides for the establishment of a Financial Stability Oversight Committee (FSOC), chaired by the Governor of the SARB with membership from the SARB, NT and financial regulators. The primary role of FSOC is to facilitate cooperation and co-ordination of action in respect of matters relating to financial stability.

It is envisaged that the SARB’s new role as “systemic regulator” will include both the oversight and maintenance of stability functions. The macroprudential framework would encompass identifying and mitigating systemic risk in the financial system through the monitoring and analysis of financial and economic variables that could affect financial stability.

In recent years, other key global central banks such as those of the Netherlands, UK and Australia have successfully implemented the “Twin Peaks” model of financial regulation, while South Africa is close to finalising its macroprudential policy framework.

4.6 CONCLUSION

The 2007-2009 global financial crisis and previous crises have proven that price stability does not guarantee financial stability and that MPIs need to be developed to target specific sources of financial imbalances to mitigate systemic risk in the financial system.

It is of critical importance that policymakers understand how to choose and apply MPIs in different countries, given different policy objectives as well as structural characteristics of its financial system and wider economy. Although certain MPIs have been deployed in emerging markets and advanced economies alike, policymakers are still challenged by how MPIs can be properly applied to reduce procyclicality. It is essential that the pros and cons of each MPI are properly assessed before being applied, as there also exists the interplay between macroprudential policy and monetary policy that affects the implementation and effectiveness of MPIs.

Because we live in an imperfect world with limited knowledge, macroprudential policies do not always reach their objectives and can fall short of not fully offsetting financial shocks or distortions. Similarly, when monetary policy has limited effectiveness, there will be higher demands placed on macroprudential policies to achieve objectives. The interaction between monetary policy and financial stability has important implications for institutional design so it is important that appropriate institutional frameworks and safeguard measures are put in place to enhance the credibility and transparency of both policy objectives, particularly when a central bank has dual mandates of price and financial stability.

CHAPTER FIVE

CALCULATING THE COUNTERCYCLICAL CAPITAL BUFFER ADD-ON FOR BANKS IN SOUTH AFRICA

5.1 INTRODUCTION

The 2007-2009 global financial crisis led to policy makers around the globe stepping up on efforts to introduce policy tools and frameworks to manage economic fluctuations and address procyclicality in the financial system. As discussed in earlier chapters, one of the main causes of the crisis was the build-up of excessive credit growth which eventually had negative implications for GDP growth and the stability of financial systems globally. The Basel II regulatory framework had somewhat succeeded in improving the resilience of the global banking sector but was nonetheless unsuccessful in preventing the full-blown 2007-2009 global financial crisis (Burra et al., 2014).

Following the crisis, Basel III regulation introduced (i) the capital conservation buffer and (ii) the countercyclical capital buffer (CCB) to address such inefficiencies in the financial system. The objective of the capital conservation buffer, as a microprudential tool, is to provide an extra cushion in addition to minimum capital requirements to protect banks against excessive fluctuations in the fortunes of the financial system by applying restrictions on earnings distribution until the buffer is re-established at the required level. The objective of the CCB as a macroprudential tool is to encourage banks to build up capital buffers in good economic times that can be drawn upon in times of stressful economic conditions.

According to the BCBS (2010c), the credit-to-GDP gap (credit gap) should be used as an indicator to monitor credit growth to detect the build-up of systemic risk, and enable national regulators to use their discretion on whether or not to apply the CCB. The credit gap can also be a useful indicator to support decisions on the timing of introduction of the CCB or the release of the buffer.

The focus of this chapter is to provide an overview of the BCBS's CCB guidelines and application thereof to South African conditions. The capital conservation buffer will not be discussed because it is largely a microprudential capital requirement, although to some extent, it can also have macroprudential effects. This chapter will also look at additional indicators for consideration in preparation for the implementation of the CCB add-on for South Africa.

5.2 BCBS GUIDELINES TO OPERATE THE COUNTERCYCLICAL CAPITAL BUFFER

The global financial crisis highlighted the dangers of systemic risk and procyclicality in the financial system after excessive credit extension by banks led to instability in the global banking sector and an economic downturn. As a result, Basel III reforms were introduced by the BCBS in 2009 to strengthen regulation of the banking sector and its risk management practices with a view to improving the banking sector's resilience to external shocks arising from distressed financial and economic conditions (BCBS, 2010a). One of the measures adopted by Basel III regulation to prevent procyclicality in the banking sector is the CCB which was designed to contribute towards capital adequacy during a crisis by requiring banks to hold adequate levels of capital to withstand economic and financial shocks. The Basel Committee expects national regulators to employ the CCB on an infrequent basis, with a likelihood of once every 10 to 20 years.

The Basel III framework requires that banks hold a buffer that ranges between zero and 2,5 per cent to total risk-weighted assets. In addition, the national authority is allowed to impose a buffer in excess of 2,5 per cent (in line with national policy) for domestically domiciled banks. The SARB (2011) indicated that the planned date for the implementation of the CCB in South Africa was 1 January 2016. In accordance with Basel III requirements, the maximum CCB requirement will start at 0,625 per cent of risk-weighted assets on 1 January 2016 and increase each subsequent year by an additional 0,625 percentage points, to reach its final maximum of 2,5 per cent of risk-weighted assets on 1 January 2019. Countries that experience excessive credit growth during this period are required to consider more rapidly building up the relevant percentage.

The BCBS (2010b: p2-5) proposed five general principles to be followed when making decisions on the CCB:

Objectives*:* Any decision on the CCB should be guided by the objectives of the intended buffer, that is, to guard against potential bank losses by monitoring credit growth and limiting systemic risk. It is important to note that the buffer is not intended to manage economic cycles or asset prices, although there is bound to be some smoothing effect.

Common reference guide: The credit gap plays a central role and should be used as a reference point by the national authority when it takes decisions on the buffer but not in a mechanical way. The national authority should be able to explain the rationale of decisions made.

Risk of misleading signals: When using the credit gap guideline, the national authority should be mindful of the factors that could cause that guideline to provide misleading signals. In order to counteract this problem, the national authority should also identify supplementary early warning signals in order to determine whether they are consistent with the credit-to-GDP guide. Such early warning signals can be classified under macroeconomic variables, banking sector variables and cost of funding variables (to be discussed in section 5.5). It is important that a national authority use sound analysis and judgment to determine whether the behaviour of the credit gap is reflective of the build-up of systemic risks or whether is it as a result of a cyclical slowdown or contraction in GDP.

Prompt release of the CCB: By promptly releasing the buffer in times of high stress in the financial system, the national authority can assist by reducing the risk of the supply of credit being constrained by regulatory capital requirements. When credit growth spontaneously moderates and systemic risks dissipate without leading to any banking stress, the national authority can gradually release the CCB. The guidelines also stipulate that, while increases in the CCB should be pre-announced by up to 12 months to allow banks sufficient time to meet these extra capital requirements, a decision to decrease the level of the buffer should take

effect immediately. The timing of the release of the CCB is therefore critical and a key determinant of the buffer's success.

Other macroprudential tools: The CCB is an important instrument in the macroprudential toolkit at the disposal of the national authority. When the national authority identifies an undue build-up of credit growth and hence of systemic risk in the financial system, the CCB should be applied, possibly in conjunction with other macroprudential tools as discussed in Chapter 4.

In addition to the above-mentioned CCB guidelines, the BCBS (2010b, pp.13-14) also proposed a three-step approach for banks to calculate the CCB.

Step 1 Calculate the aggregate private sector credit-to-GDP ratio.

Step 2 Calculate the credit gap, that is, the gap between the ratio and its trend.

Step 3 Transform the credit gap into the guide CCB add-on.

The credit gap, which is dependent on deviations in the credit-to-GDP ratio from its long-term trend, is the main reference point and key determinant for the implementation of the CCB add-on. The BCBS (2010a) notes that the definition of credit includes all types of credit extended to households and other non-financial private entities by domestic and international banks, non-bank financial institutions (domestic or foreign), all debt securities issued domestically or internationally to fund households and other non-financial private entities, including securitisations.

Typically, this would also include securities held by banks and other financial institutions as well as residents and non-residents. Borio (2014a) also notes that credit refers to all types of lending by both banks and non-banks as well as asset purchases by banks and non-banks.

5.3 CALCULATING THE COUNTERCYLICAL CAPITAL BUFFER ADD-ON FOR SOUTH AFRICA

Since historically most financial crises were precipitated by excessive credit growth, the credit gap qualifies as an early warning indicator of financial distress, which is why the BCBS (2010c) and the IMF (2014a) propose using it as the main point of reference for the CCB. The methodological approach to calculate the credit-to-GDP ratio and credit gap is described below. The CCB levels will be calculated and correlations will be done with the corresponding GDP growth rates.

5.3.1 Methodology and data description for the calculation of the CCB add-on for South African banks

The BCBS guidance proposes the use of a one-sided Hodrick-Prescott (HP) filter to establish the trend in the time series of the credit-to-GDP ratio. A comparison of the actual credit-to-GDP ratio with its long-term trend obtained using the HP filter enables a jurisdiction to determine whether or not credit growth is excessive.

In the generic form, the HP filter estimates the trend by using the following equation:

$$L = \frac{1}{T}\sum_{t=1}^{T}(\boldsymbol{y}_t - \mu_t)^2 + \frac{\lambda}{T}\sum_{t=2}^{T-1}[(\mu_{t+1} - \mu_t) - (\mu_t - \mu_{t-1})]^2$$

Source: BCBS (2010b)

For the purposes of the CCB, the one-sided HP filter with a high smoothing parameter, is used to calculate the trend (*Trend(t) or* μ_t in the above equation) and only data available at each point in time is used for the calculation.

According to Hodrick and Prescott (1997), the HP filter decomposes a time series y_t ($t = 1, 2, 3, \ldots T$) into a trend component (μ_t) and a cyclical component ($y_t - \mu_t$). On the right-hand side of the above equation, the first term records the average of the squared deviations from trend (the cyclical component), while the second term registers the average of the squared variations in the growth rate in trend. The

trend variable (μ_t) is then chosen in such a way that the sum (L) of these two terms is minimised. The smoothing parameter λ (which is set to λ= 400 000) determines how smooth the trend will be by penalising variation in its growth rate (BCBS (2010b).

The HP filter has the benefit of allocating higher weights to the latest observations, which is a good indicator of increased systemic risk at the current point in time. This feature of the HP filter also deals more effectively with structural breaks (Farrell, 2013). According to Drehmann et al. (2010), the trend calculated using λ at 400 000 is a reasonably good measure of determining the long-term trend in credit extension to the private sector.

As discussed earlier, the gap between the private sector credit-to-GDP ratio and its long term trend is calculated according to the BCBS 3-step guideline.

5.3.2 Application of the BCBS three-step guideline for South Africa

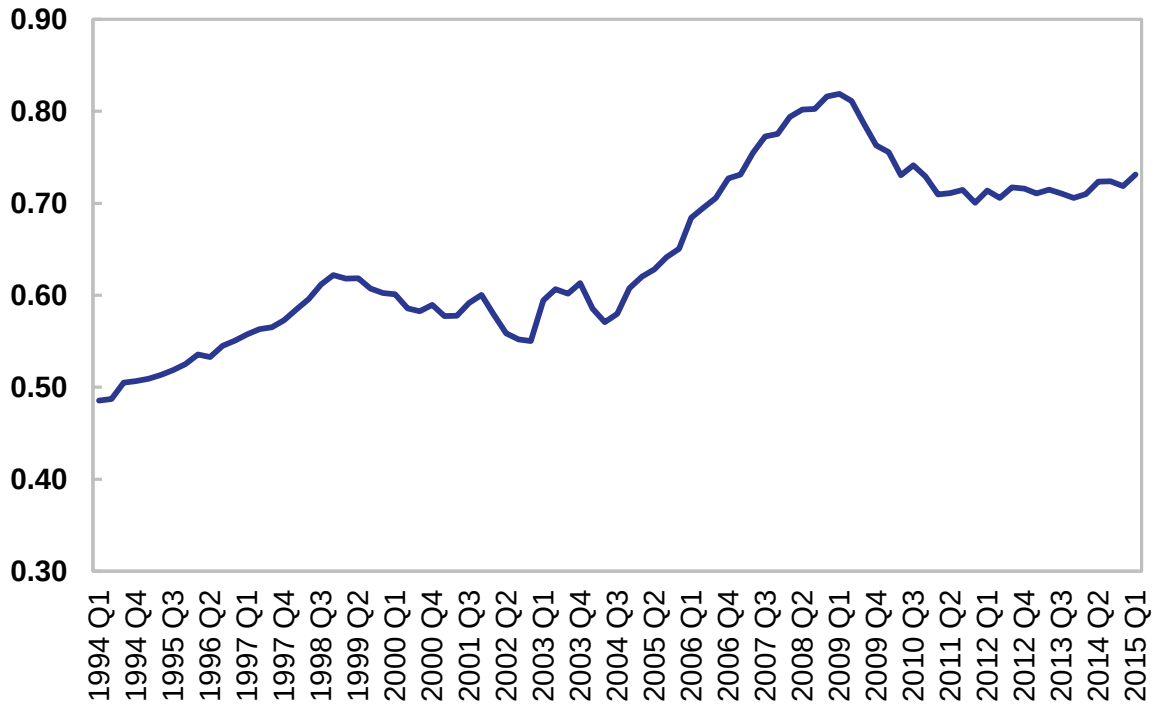
Step 1: Calculation of the credit-to-GDP ratio

The credit-to-GDP ratio is calculated by dividing credit figures by GDP figures and expressing the ratio as a percentage: *R(t) = credit(t)/GDP(t) x 100 per cent,* where *R(t)* is the credit-to-GDP ratio in period t, *credit(t)* is a broad measure of credit to the private non-financial sector in period t, while *GDP(t)* represents the Gross Domestic Product over period t. Both *GDP(t)* and *credit(t)* are in nominal terms and on a quarterly frequency (BCBS, 2010b).

For the application of the BCBS guidance to South Africa, data is used from the SARB's *Quarterly Bulletin from 1Q1994 - 2Q2015* for "Quarterly expenditure on GDP at current prices" (seasonally adjusted and annualised, series code KBP6006L). Monthly data for "total credit extended to the private sector" is used to generate the corresponding quarterly values (KBP1347M). In this study, there are

85 data points over the period *1Q1994 to 2Q2015*[13]. From this data, the credit-to-GDP ratio was calculated (see Figure 5.1).

Figure 5.1 Credit-to-GDP ratio of South Africa



Source: South African Reserve Bank and author's calculations

Step 2: Calculation of the credit gap

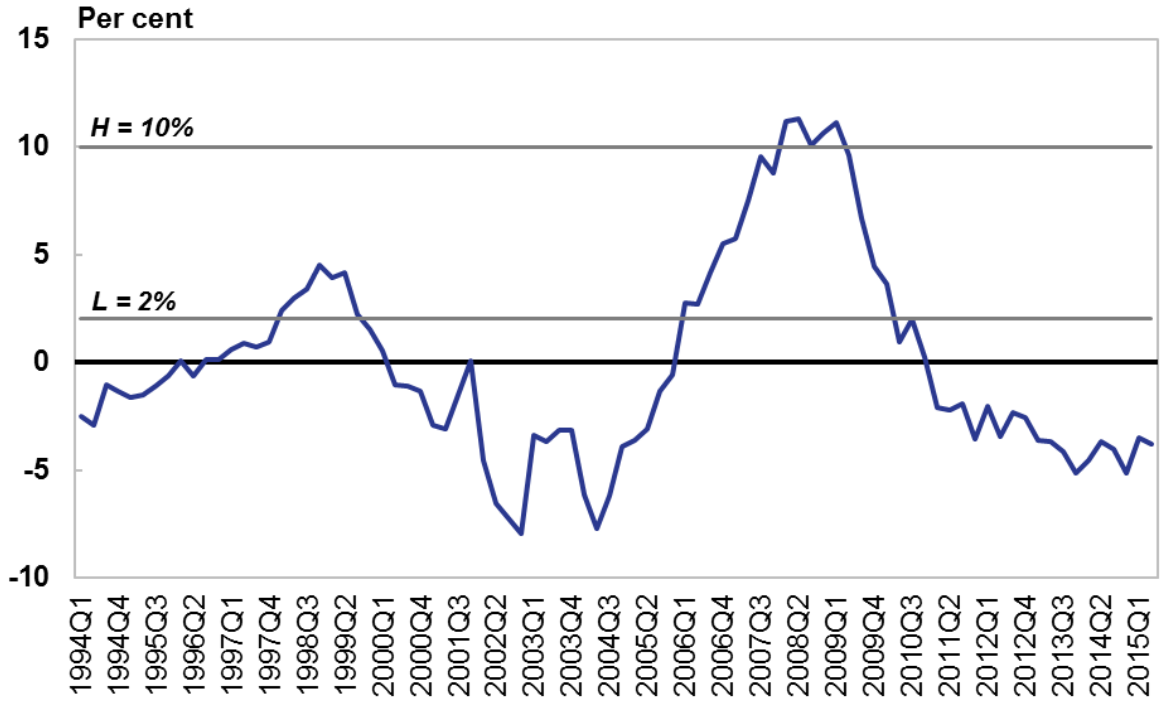
The credit gap is calculated as the difference between the credit-to-GDP ratio and its long-term trend. The trend is calculated by means of a one-sided HP filter using a recommended smoothing parameter (λ) of 400 000.

According to the IMF (2014), the use of the HP filter is justified as financial cycles tend to be longer than business cycles. If there is a large positive gap, that is, the credit-to-GDP ratio is significantly above its trend, this indicates that the credit level in the economy might have exceeded the economy's growth rate. Using the

[13] Data for the calculation of South Africa's credit-to-GDP ratio and credit gap can be accessed online at http://www.resbank.co.za/Research/Statistics/Pages/OnlineDownloadFacility.aspx

recommended smoothing parameter of 400 000 for the HP filter, the credit gap for South Africa since 1965 is illustrated in Figure 5.2.

Figure 5.2 Credit gap for South Africa



Source: South African Reserve Bank and author's calculations

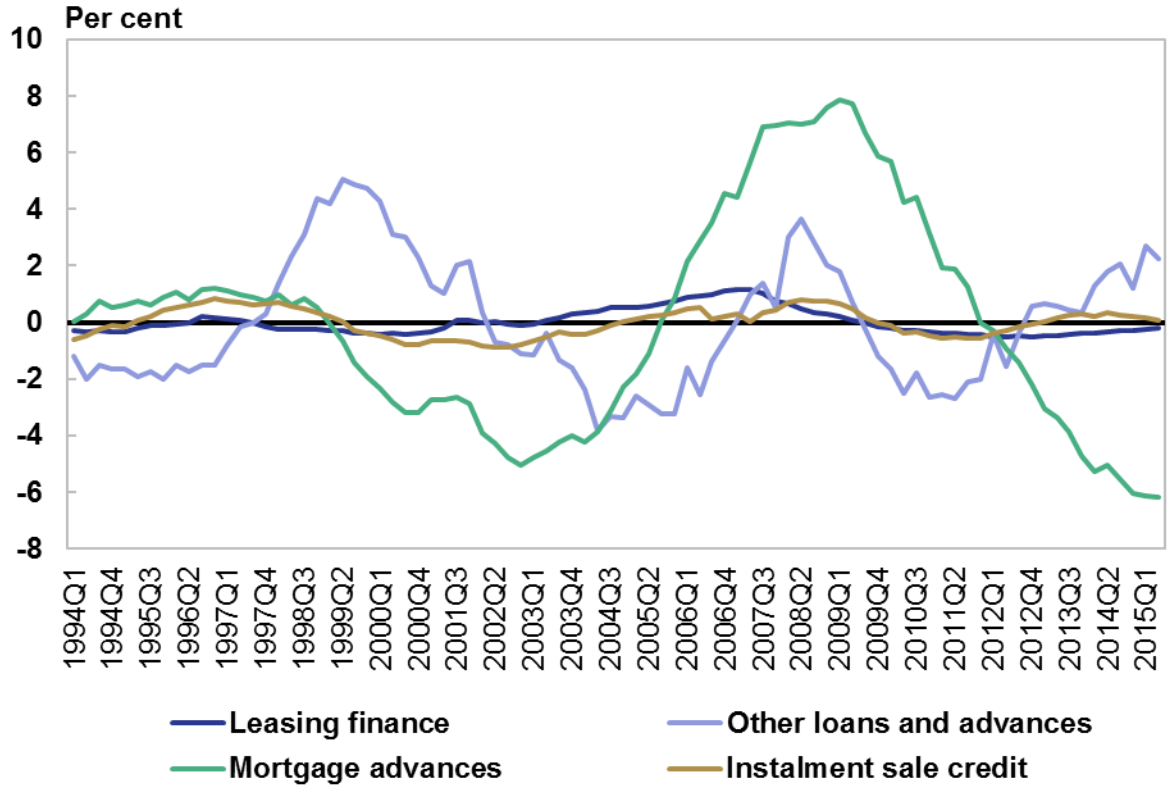
From the above analysis, it is evident that the credit gap has been positive for several sustained periods since 1994, and exceeded the long term trend (that is, zero) for the periods 1990-1992, 1998–2000 and 2006-2010 (SARB, 2011 and Burra et al (2014). The gap started from -2,54 per cent in 1994, increased to 4,5 per cent in 1998, before declining to -7,95 per cent in 2002 and peaking at a high of 11,33 per cent in 2008.

The gap appeared to have delivered a strong warning signal for the CCB add-on from 2006-2010, which one might interpret as excessive credit growth or the build-up of a housing bubble ahead of the 2008 financial crisis (Burra et al. 2014 and van Vuuren, 2012). During this period, loans and advances increased significantly while non-performing loans decreased. Figure 5.2 seems to suggest that there

was a housing bubble in South Africa at about the same time as that of the United States. Since the end of 2009, however, there has been a persistent declining trend in the credit gap, with the gap remaining negative and well below its long-term trend.

If one does apply the credit gap to different loan categories, the results are quite interesting (see Figure 5.3). Individual loan categories indicate different growth rates relative to their long-term trends. Two loan categories, namely “leasing finance” and “instalment sale credit” fluctuate little around their long-term trend, thereby implying levels of credit growth roughly corresponding with GDP growth. The credit gap for “mortgage advances” was not only well below its long-term trend, but also declined further during the past few years, indicating levels of credit growth below GDP growth.

Figure 5.3 Selected private-sector credit gaps according to credit categories



Source: South African Reserve Bank and author’s calculations

However, the credit gap for “other loans and advances” indicates that credit growth relative to GDP has remained above its long-term trend since the end of 2012. The “other loans and advances” category is the biggest loan category of the SARB and is made up of 41 per cent of total credit, followed by “mortgage advances (40 per cent), “instalment sale credit” (12,0 per cent) and the remaining credit categories, including “leasing finance” (7,0 per cent) (SARB, 2015b).

“Other loans and advances” is made up of general loans, bank overdrafts and credit card advances. Since 2014, this loan category has been the main driver of credit growth, largely owing to sharp increases in general loans extended to the corporate sector as well as a strong uptake of overdraft facilities possibly due to the large increases in civil servant employment causing many more people to qualify for bank overdrafts and other loans (SARB, 2015c).

Step 3: Calibration of the CCB add-on

The last step in the process is to transform the credit gap into the CCB add-on (*B(t)*) by calibrating *B(t)* in accordance with banking conditions in South Africa, where, $B_t \in [B^L = 0, B^H = 2.5]$, and B^L and B^H are the minimum and maximum values for the add-on associated with the lower (*L*) and higher (*H*) threshold levels for the credit gap.

The lower and higher thresholds *L* and *H* are important to determine the timing and the speed of the adjustment of the guide buffer add-on to underlying conditions. According to the BCBS (2010a), an adjustment factor based on *L=2* and *H=10* provides a reasonable specification based on historical banking crises. However, this also depends on the choice of the smoothing parameter (*λ*), the length of the period over which the relevant credit and GDP data are recorded, and the exact setting of *L* and *H*.

Setting *L=2* means that when *((Credit(t)/GDP(t)) x 100%) – (Trend(t)) <2%*, the buffer add-on is zero. Setting *H=10* means that when *((Credit(t)/GDP(t)) x 100%) – (Trend(t)) >10%*, the buffer add-on is at its maximum.

As per the BCBS guideline, the maximum buffer add-on (VBmax) is 2,5 per cent of risk-weighted assets. In light of the CCB calibration, when the credit-to-GDP ratio is 2 percentage points or less above its long term trend, the buffer add-on (VBt) will be 0 per cent. When the credit-to-GDP ratio exceeds its long term trend by 10 percentage points or more, the buffer add-on will be 2,5 per cent of risk weighted assets. When the credit-to-GDP ratio is between 2 and 10 percentage points of its trend, the buffer add-on will vary linearly between 0 per cent and 2,5 per cent. This will imply, for example, a buffer of 1,25 per cent when the credit gap is 6 (half way between 2 and 10).

Repullo and Saurina (2011) point out that it is important for the national authority to exercise caution when choosing thresholds, as the levels of *L* and *H* are only a recommendation from the BCBS. In this regard, *L* should be low enough to ensure that the CCB kicks in early enough to give banks sufficient time to build up capital ahead of a possible banking crisis. The BCBS guidelines prescribe that banks are allowed up to one year to raise additional capital, which means that the indicator should signal a crisis at least 2–3 years in advance. During normal times, *L* should be high enough so that no additional capital is required when there is no realistic threat of an impending crisis. *H* suggests the point at which no additional capital is needed, even if the gap were to continue increasing. That point should be high enough so that the buffer is sufficient to deal with a possible severe banking crisis but low enough so that no unnecessary burden to increase capital is imposed on the banks.

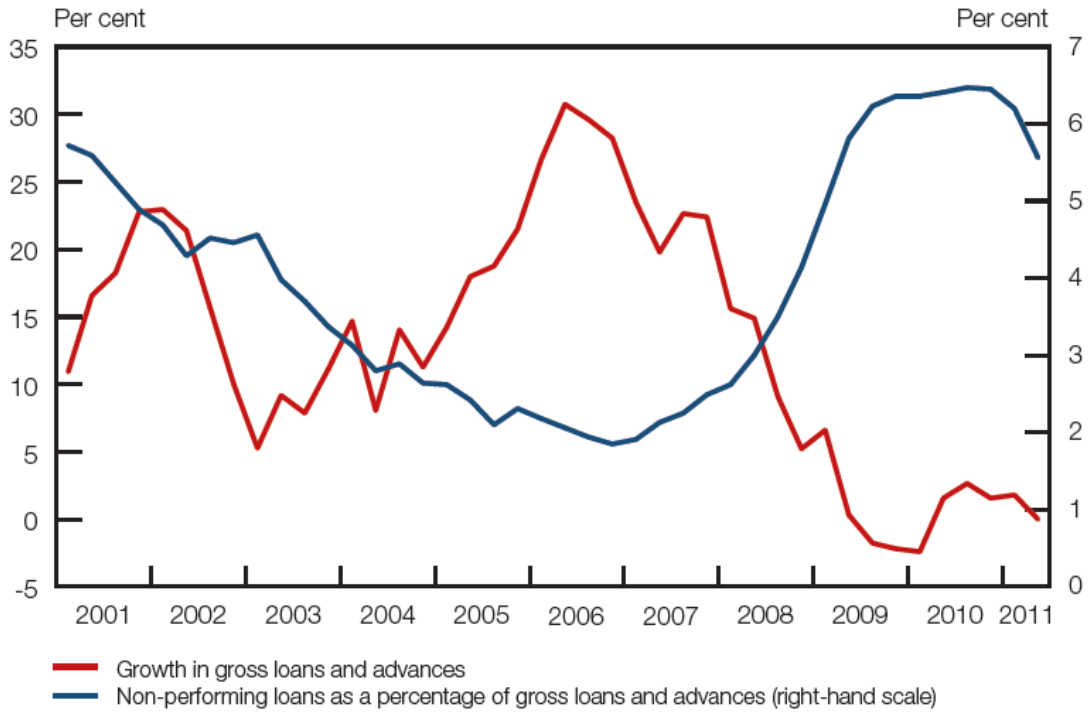
When applied to South African banks, for the corresponding period (1Q1994 to 2Q2015, 85 observations), the credit gaps were below *L = 2* for 62 observations (73,0 per cent of the sample) and exceeded *H = 10* for 7 observations (8.2 per cent of the sample). For the BCBS calibration (*L = 2*, *H = 10*), the guidance would be for a CCB add-on buffer to be implemented at about 27 per cent of the time since 1994 (and at the maximum level of 2,5 per cent for about 8.0 per cent of the time).

At present (2Q2015), when applying the CCB calibration (*L=2*, *H=10*) to South Africa, it is evident that the credit gap remains well below the lower threshold of

the CCB add-on for South African banks. Therefore, there does not appear to be a need to consider a CCB add-on for domestic banks at present (SARB, 2015b). Furthermore, the SARB has not yet made a decision on applying the CCB add-on on individual loan categories, which is also not a requirement of the Basel III regulation at this stage.

The timing of the CCB release is instrumental in determining the ultimate success of the CCB in providing banks with a cushion to absorb capital losses when their loan books become exposed to economic downturns (Burra et al., 2014). According to the SARB (2011), one of the most efficient ways of deciding on the timing of the release of the CCB add-on is to assess the performance of loan growth and non-performing loan growth. An investigation into loan growth and non-performing loan growth in the South African banking sector indicated that between 2003 and 2006 (credit boom) loan growth increased substantially while non-performing loans declined.

Figure 5.4 Loan growth and non-performing loans in South Africa



Source: South African Reserve Bank, Financial Stability Review, September 2015

After the onset of the crisis, when there was a global economic crisis, loan growth in South Africa declined while there was a sharp increase in non-performing loans, peaking at about 6,5 per cent of gross loans and advances in 2010. The SARB (2011) argued that loan growth and non-performing loan growth, in conjunction with supervisory discretion, could serve as useful indicators to decide on when to activate the CCB add-on, thereby playing a critical role in mitigating systemic risk in the banking sector.

Overall, the credit gap is generally viewed as a good indicator to identify excessive credit growth and forthcoming financial crises. However, there have been concerns raised about its reliability under certain circumstances. The following section discusses some of the key criticisms of the credit gap as an indicator of future financial crises.

5.4 CRITICISMS OF THE CREDIT GAP AS A PREDICTOR OF FUTURE FINANCIAL CRISES

One of the guidelines stipulated by the BCBS is that jurisdictions need to make a proper distinction between weak and strong signals from the credit gap when making decisions about the CCB add-on (Burra et al., 2014). In this regard, the SARB recognised three international financial crises that led to periods of financial distress but not fully-blown financial crises in South Africa (SARB, 2011). These periods of financial distress included the (i) 1985-1987 debt-standstill and flight of capital crisis; (ii) 1997-1999 South-East Asian crisis; and (iii) 2007-2009 global financial crisis.

The distinction between weak and strong signals for the credit gap could, for example, be applied to the 1997-1999 South-East Asian crisis where credit appeared to be lagging the business cycle with the result that South Africa's credit-to-GDP ratio became negatively correlated with the GDP (Repullo & Saurina, 2011). In this instance, because the credit-to-GDP ratio rose due to declines in GDP growth rather than to increases in credit growth, the credit-to-GDP ratio became negatively correlated with GDP growth. The problem was exacerbated for the credit gap (that is, the deviation of the credit-to-GDP ratio from its long-term trend),

because it took time for the trend line to rise due to GDP contractions and hence time for the gap to cross the trend line.

From a South African perspective, Van Vuuren (2012) pointed out that there was evidence to show that South Africa's variables of credit growth and GDP lagged each other, thus rendering the credit gap unreliable as there could have been instances where excessive credit growth or overheating in the economy remained undetected.

Interestingly, the BCBS (2010c) acknowledges that the credit gap might not be a reliable indicator of financial market distress during economic downturns and they propose that jurisdictions use their judgment when deciding on when to apply the buffer.

An alternative to using the credit gap as a common reference point for deciding on the CCB add-on is to use deviations of credit growth with respect to its long-run average. Repullo and Saurina (2011) argued that deviations in credit growth from its long-run average would eliminate a lag effect as there is no direct consideration of GDP and hence no possibility of credit growth leading or lagging GDP growth.

In order to act as a "common reference point" for building up capital buffers during financial booms and releasing capital buffers during financial busts, financial indicators should ideally be positively correlated with the financial cycle. In the case of South Africa, the SARB (2011) notes that most indicators are indeed positively correlated with GDP, with the exception of the credit gap which has a negative correlation with GDP. Given that the credit gap should be used as a reference point or leading indicator for the CCB add-on, the negative correlation with GDP raises concerns as it implies that capital buffers should be reduced when GDP growth is high and increased when GDP growth is low. This has implications for the timing of the release or withdrawal of the CCB add-on. In this regard, it is important that the SARB exercises a degree of caution and not use a mechanical approach when applying the CCB.

The World Bank (2010) adds that the credit gap is not always a reliable indicator, largely owing to measurement problems relating to the calculation of the long-term

trend of the ratio, which has implications for policymakers who make decisions based on a trend on data end points (that is, most recent observations). Drehmann et al. (2011) and Ghosh (2015) point out that it is widely known that the HP filter has an end data point problem which makes it sensitive to data revisions. This means that the estimated trend at the end data point can undergo drastic changes as future data points come on stream. If the trend is revised once future data becomes available, it also affects the deviation of the credit-to-GDP ratio from the trend, which raises questions about the reliability of the credit gap as a EWI for the CCB add-on (Farrell, 2013 and Edge & Meisenzahl, 2011).

Geršl and Seidler (2012) point out that a similar type of challenge resides at the start of a time series that is used to calculate the credit gap or when there are structural breaks, particularly for short data series, typically found in emerging markets. In this regard, the BCBS (2010b) recommends that the credit gap can only be used as a reliable indicator for CCB decisions when at least ten years of data for the credit-to-GDP ratio are available. In their studies, they concluded that shorter time series data tends to produce large differences between credit gaps, thereby resulting in the trend being excessively high or excessively low for prolonged periods of time.

Drehmann and Tsatsaronis (2014) also conducted simulations to determine whether the above-mentioned criticisms were valid. They used an estimated time series model to create 100 artificial series of credit-to-GDP ratios. Their findings indicated that measurement challenges relating to data start-and-end points were not severe and that even when there were differences in the gaps, the differences in the resulting CCB levels were small. Their results also showed that the credit gap is a reliable indicator if applied to at least ten years of data.

However, their study did conclude that caution needed to be exercised in particular instances. For example, there were large differences in credit gaps calculated on shorter and longer samples, particularly where the shorter sample began close to the peak or the trough of the financial cycle. This implied that the trend remained excessively high or excessively low for prolonged periods of time. In this regard, they proposed that jurisdictions consider dropping some initial data

points. Farrell (2013), on the other hand, argued that the source of unreliability derived from updated data points could be resolved by jurisdictions applying more frequent revisions to GDP and other key indicators.

Van Norden (2011) also did a similar study, concluding that holistically, the credit gap did possess reliable signalling ability. His argument was based on the fact that a jurisdiction would not be able to apply a two-sided filter which required forecasting future values of the credit-to-GDP ratio and credit gap. Therefore, the credit gap derived from a one-sided HP filter would be a more reliable indicator of excessive credit growth in the financial system than a two-sided filter. This study indeed heeded this call and used the one-sided filter.

Another criticism of the credit gap is that it could hamper the development of financial systems, particularly in emerging markets. The Reserve Bank of India (2013) believes that emerging markets that are in a growing phase can experience high levels and longer periods of credit growth as the middle-class population evolves. However, if the CCB add-on is applied at these levels of credit growth, credit growth can be impeded, thereby limiting financial deepening in these countries and making emerging markets less competitive with their advanced economy counterparts.

Given the above-mentioned concerns and criticisms on the credit gap as a reliable indicator of financial crises, it important that jurisdictions exercise caution by investigating whether credit levels are sustainable or whether they are a risk to financial stability. This can be achieved by implementing a range of additional indicators to identify vulnerabilities in the financial system instead of just using a mechanical, rules-based approach to making decisions on the CCB buffer. The next section identifies additional variables that can be used as EWIs.

5.5 ADDITIONAL EARLY WARNING INDICATORS

Berg and Pattillo (2000) argue that different asset classes might give conflicting signals as they are affected by different risks. It is important that jurisdictions exercise judgment and treat the results of EWIs with caution and objectivity. EWIs

should consist of indicators that represent fundamentals and vulnerabilities which should complement each other. For example, a country with weak economic fundamentals but healthy liquidity conditions would not be able to sustain its favourable position for a long time. However, a country with strong economic fundamentals and weak liquidity conditions might be in a position to deal better with external shocks than the former country.

Indicators should also include measures of financial market sentiment, as the financial and real sectors of the economy are interconnected. In addition, most economies are interconnected and developments in one country could have negative spillover effects into other countries. Drehmann and Juselius (2013) and Drehmann and Tsatsaronis (2014) add that timing is a critical component for EWIs, which should be sounding alarm bells at least one and a half years but no more than five years ahead of a crisis.

Borio and Drehmann (2009a), Alessi and Detken (2011) identified a number of macroeconomic variables, banking sector activity variables and funding variables that can be used as EWIs to assess systemic risk and provide “a common reference point” for the set-up of the CCB. The next section surveys further possible reference points.

5.5.1 Macroeconomic variables

a) Real GDP growth

This is an important indicator to assess whether credit growth during boom periods is excessively high or not. It should thereby be noted that it is credit growth in excess of GDP growth which is potentially dangerous as it suggests that credit is increasingly used to finance asset price increases rather than real economic growth.

b) Aggregate real credit growth

This variable provides a reliable measure of credit extension across different categories during boom and bust periods. Useful information can be provided on deviations of credit growth from its long-term trend or average. Bas et al. (2012) state that while it is difficult to differentiate between favourable and unfavourable credit booms, unfavourable credit booms are usually larger and last longer.

c) Asset price growth

Similar to the credit-to-GDP ratio, asset prices (for example, property prices, equity prices etc.) generally reflect robust growth after banking crises and sharp declines during stressful financial conditions. Again, it is important to investigate the deviation of aggregate asset prices from their long-term trend.

5.5.2 Banking sector variables

a) Bank credit growth

The growth rate of bank lending is positively correlated to the business cycle and can serve as a valuable indicator of the pace of credit extension by banks.

b) Banking sector profits

Profits by banks reflect the overall performance of the banking sector. For example, in times of boom periods, banks' earnings are high while in times of distressed economic conditions, earnings are lower.

c) Aggregate losses

There is generally a negative correlation between aggregate losses in the banking system and real GDP growth. Aggregate losses are due to cost components such as non-performing loans, loan provisions etc.).

d) Debt service ratios

Debt service ratios have the ability to capture early liquidity constraints of borrowers by providing a measure of the cash flow that is available to pay current debt obligations (Drehmann & Juselius, 2012). High debt service ratios imply high indebtedness by households and firms which could result in higher loan defaults and trigger a banking crisis.

5.5.3 Cost of funding variables

a) Banking sector credit spread indices

These types of indices serve as vulnerability measures that indicate systemic risk in the banking sector, for example, credit default swap (CDS) spreads. A CDS spread is the premium paid for protection by the buyer to the seller. CDS spreads are good indicators of default risk in the banking sector as a rise in CDS spreads would indicate a rising risk of debt defaults.

b) Cost of liquidity

The interbank market serves to redistribute, according to need, the total amount of cash that the central bank makes available to the banking system as a whole, usually through its open market operations with the larger banks. Given that banks themselves are often the first to know when fellow banks are in trouble, an increase in the interbank market rate may serve as an EWI for financial distress among banks. As the financial position of banks worsens, smaller banks pay more for liquidity than larger banks as smaller banks are more vulnerable to liquidity squeezes and don't always have direct access to central bank accommodation (Fecht, Nyborg and Rocholl, 2011).

In essence, a shortage of liquidity in the interbank market caused by deterioration in banks' financial positions or other economic shocks could result in banks funding costs increasing as they have to pay more for liquidity, placing them in a

vulnerable position and having implications for systemic risk. This could adversely affect all asset classes and cause instability in the banking sector.

c) Corporate bond spreads

This is an important indicator of credit risk and credit quality. Corporations often issue bonds for a variety of reasons which include paying dividends to shareholders, buying another company, financing an operating loss, or expanding the company. The difference between corporate bonds and other bonds such as government or municipal bonds is that corporate bonds are taxable by the government. Therefore, corporate bonds have more credit risk attached to them that other types of bonds.

Corporate bond yield spreads can provide important information about credit risk in bond markets. A yield spread typically refers to the difference in yield between a corporate bond and a government bond of comparable maturity, which is generally expressed in “basis points”. The higher the risk attached to a bond, the higher its yield spread, as investors need to be compensated for taking on the additional risk relative to the risk on a government bond. If an investment is seen be less risky, investors would require less compensation and if an investment is regarded as more risky, investors would need to be paid a higher yield or premium.

Such bond spreads tend to fall during good economic times, while they generally widen during times of stressful financial conditions. That said, however, Gilchrist and Zakrajsek (2012) argue that in conditions of low perceived risk, financial systems could be vulnerable to crises, as credit is cheap and accessible, which could result in the build-up of financial imbalances and a greater probability of a sharp rise in credit spreads.

In addition, Chen et al. (2007) argue that liquidity is priced in corporate yield spreads. Using data that covers over 4000 corporate bonds, including both investment grade and speculative categories, they conclude that illiquid bonds have higher yield spreads, while the enhanced liquidity of bonds results in substantial declines in yield spreads relative to the yield on comparable

government bonds. Therefore it is important to monitor corporate bond spreads as they provide indications of credit risk as well as the credit quality of bonds.

5.5.4 Leverage measures

The IMF (2014c) also recognises leverage as an EWI. One of the main causes of the 2007-2009 financial crisis was the build-up of excessive on- and off-balance sheet leverage in the financial system. During the peak of the crisis, asset prices fell which resulted in large losses for banks with large amounts of toxic assets on their balance sheet which they had financed through repos in the wholesale money market. The accompanying reduction in bank capital forced these banks to deleverage which caused a contraction in credit extension and led to a reduction in real output. Measures of leverage (such as LTVs for property, margin requirements for OTC derivatives – discussed in Chapter 4) are regarded as useful EWIs to detect the build-up of systemic risks as these measures can provide a useful reference point for household debt relative to equity.

5.6 EARLY WARNING INDICATORS IN USE BY CENTRAL BANKS WHICH HAVE IMPLEMENTED THE CCB

In line with the BCBS proposals, the following central banks have already implemented the CCB and identified additional indicators to support the decision-making process of the application of the CCB add-on: SNB, Norges Bank, BoE and Reserve Bank of India (RBI).

The CCB was implemented by the SNB in July 2012. In Switzerland, financial stability risk has largely been driven by strong growth in the country's mortgage and property markets (SNB, 2012). The SNB uses the following indicators to assess systemic risk in the financial system: domestic mortgage volume indicators (that is, the ratio of mortgages to GDP), property prices, measures of interest rate risk, interest rate margins, and leverage ratios (SNB, 2014).

The Norges Bank implemented the CCB on 30 June 2015 and identified the following four indicators to assess financial vulnerabilities in the domestic financial

system: (i) the ratio of total credit (households and enterprises) to GDP, (ii) the ratio of house prices to household disposable income, (iii) commercial property prices, and (iv) the wholesale funding ratio of domestic credit institutions. On a historical basis, these four indicators have been seen to have risen ahead of periods of financial instability (Norges Bank, 2015).

The Financial Policy Committee (FPC) of the BoE implemented the CCB on 1 May 2014. Aside from engaging in market intelligence and assessing results of stress tests, the FPC also uses the following indicators to assess risks to financial stability: capital ratios, leverage ratios, average risk weights, return on assets before tax, loan to deposit ratio, short-term wholesale funding, bank debt measures, bank equity measures, credit growth, net foreign asset position, gross external liabilities, current account balance, global corporate bond spreads, spreads on new lending, longer-term interest rates and the VIX index (volatility index of the Chicago Board Options Exchange) (BoE, 2015).

Some of the key supplementary indicators used by the RBI include the credit-to-deposit ratio, the industry outlook assessment index (and correlation to GNP growth) and the interest coverage ratio (and its correlation with the credit gap). Going forward, the RBI has announced that it would use indices such as the House Price Index or Residex as well as the Credit Condition Survey to make CCB decisions.

The SARB uses a variety of indicators to determine the build-up of systemic risk in the financial system. These include; the Network Systemic Index for the Interbank Market (measuring the systemic importance of individual banks in the South African banking sector on a monthly basis); the monitoring of sub-categories of shadow banking (such as money market funds, hedge funds, finance companies, fixed income funds, multi asset funds etc.); measures to detect stress in the foreign exchange market (the Index of Exchange Market Pressure) and the adequate level of foreign exchange reserves (Guidotti Ratio). Other key measures include household debt to disposable income, growth in private sector credit advances to the domestic banking sector, developments in the non-financial

corporate sector, and building plans passed (SARB, 2015b and Burra et al., 2014).

5.7 FINDINGS AND CONCLUSION

The CCB is widely recognised as an effective measure of promoting financial stability by addressing procylicality in the financial system and ensuring that banks are adequately capitalised. A key lesson for all jurisdictions implementing the CCB is to ensure that the BCBS rules or guidelines are combined with judgment and adapted accordingly to each country's economic conditions, stage of development and institutional framework, instead of just taking a mechanical and rules-based approach to implement the buffer.

The implementation of the CCB was phased in from January 2016. The analysis done on the application of the CCB (as at the second quarter of 2015) reflected a declining trend in the private-sector credit gap since the onset of the 2007 global financial crisis, thereby causing the gap to remain well below its long-term average. In addition, for most other categories of loans, the credit gaps either remained well below their long-term trend, or remained relatively constant, in line with the long-term trends. Overall, the credit gap remained well below the lower threshold of the CCB add-on for domestic banks, implying low levels of credit growth. Hence, there does not appear to be a need from a macroprudential regulatory perspective to consider a CCB add-on for South African banks.

A lesson that the South African authorities can adopt is to distinguish between "weak" and "strong" signals from the credit gap and be aware that the credit-to-GDP ratio could also possibly be an indication of cyclical slowdowns or declines in GDP growth rather than excessive credit growth. In this regard, the SARB could consider calculating the deviation in credit growth from its long-term trend to determine if there is a correlation between credit extension and the financial cycle. In theory, financial variable indicators should be positively correlated with the financial cycle. However, in South Africa, the credit gap has a negative correlation with GDP (SARB, 2011), implying that capital buffers should be reduced when

GDP growth is high and vice versa. In this regard, it is recommended that further research should be done on these phenomena as it could have implications for the timing of the release or withdrawal of the CCB when required.

Another challenge with using the credit gap is measurement problems of the HP filter. Critics have pointed out that data revisions to the real-time SA credit gap mostly emanate from new data points as they become available, therefore accounting for a relatively small proportion of total revisions. This implies unreliability in the credit gap. However, studies have indicated that the credit gap is a reliable indicator if applied to at least ten years of economic data. Furthermore, any source of unreliability derived from updated data points can be resolved by the SARB considering more frequent revisions to GDP and other key indicators.

It is important that jurisdictions including the SARB should use additional financial or economic EWIs to help reduce bank losses associated with banking crises by detecting possible crises and providing guidance to the national authority on the application of the CCB. While South Africa has identified a set of EWIs, lessons can also be drawn by investigating the different EWIs used by countries such as the Switzerland, Norway, the UK and Hong Kong that have implemented the CCB guide.

In summary, despite the overall robustness of the credit gap, there is no “one-size-fits-all” approach, as reflected in some of the concerns raised above. It is must be noted that the objective of the buffer is to identify excessive credit growth and ensure that the banking sector had sufficient regulatory capital to endure economic and financial shocks, rather than managing the financial cycle. The SARB and other jurisdictions would benefit from exercising judgment, conducting sound quantitative analysis to meet the Basel III requirements for the CCB application as well as be transparent by clearly communicating the reason for its decisions.

CHAPTER SIX

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

6.1 SUMMARY

In the build-up to the 2007-2009 global financial crisis, there were widespread financial imbalances that existed, largely owing to many years of low financial market volatility and risk premia, rapid financial innovation and questionable lending practices in credit markets, low policy rates and favourable liquidity conditions. It was argued that during these pre-crisis years of high economic growth rates, central banks paid too much attention to inflation and price stability, and almost no attention to systemic risks associated with the growing macroeconomic imbalances. Banks lacked the diagnostic tools and clear mandates to supervise financial systems in their entirety as they failed to assess the common exposures of systemically important institutions and identify the pro-cyclical build-up of asset price bubbles. It became clear that financial stability and macroprudential policy were needed to be strengthened to ensure proper regulation and supervision of the financial system as a whole.

The property bubble eventually burst in 2007, resulting in increased loan delinquency and bankruptcy amongst systemically-important lenders and large hedge funds. Banks began to tighten their credit standards which led to a decline in domestic demand and consumer confidence. The distress among banks resulted in low levels of liquidity in interbank markets as banks became reluctant to lend to each other on fears of counterparty risks.

These developments led to heightened risk aversion in financial markets and deleveraging by financial institutions which slowed down private sector credit growth. As a result, there was contraction in US economic growth in 2009 and the combination of lower growth and a collapse in US equity prices negatively impacted on profitability of financial institutions, resulting in more bank failures.

Due to the interconnectedness of financial markets, there were spillover effects from the US subprime crisis to Europe, whereby European banks had large exposure to US banks as well as large amounts of subprime-related US structured products on their balance sheets. Most emerging market economies did not have large exposures to US and European banks and therefore did not suffer system wide bank failures. However, the effects of a slowdown in growth in advanced economies were severe on emerging market growth due to their dependency on exports to advanced economies.

In essence, four critical phases of the crisis were identified. The first stage of the crisis was in 2005, when US house prices began to decline rapidly and delinquency rates on subprime mortgages began to rise. At this stage, the Fed has begun raising interest rates. The second stage of the crisis was characterised by a widening in credit spreads in February 2007 on unregulated securitisation products as US and European banks began experiencing financial difficulties and securities backed by subprime loans were downgraded or placed on credit watch. Banks became reluctant to lend to each other on fears of counterparty risks, resulting in a spike in interest rate spreads on commercial paper and commercial bonds over government bonds, a shortening of maturities as well as wide-spread losses across most asset classes. Interbank lending in most advanced economies froze, causing severe liquidity problems throughout the US banking system.

The third stage of the crisis was in September 2008, characterised by high levels of volatility as banks stopped lending to each other due to panic over their exposure to US sub-prime mortgages and structured finance packages. It was at this point that the credit crunch and liquidity crisis had spread to Europe. Conditions deteriorated after the failure of Lehman Brothers in September 2008, followed by other large banks in the US, UK and eurozone, which also required government bail-outs. The problems were exacerbated by concerns of a solvency crisis instead of a liquidity crisis. This led to heightened risk aversion as money markets collapsed, equity prices plummeted and credit spreads rose sharply.

Finally, the fourth stage of the crisis began in late 2008 when there were spillover effects from financial markets in advanced economies to the real sector, where

banks began experiencing problems in accessing capital, with tighter credit conditions leading to slower demand for credit and hence slower private sector credit growth and lower spending. Many advanced economies had experienced contractions in real GDP growth.

In essence, what started off as a liquidity problem for US non-bank intermediaries had quickly transformed into a bank solvency problem in the US as well as Europe. The transmission of these liquidity shocks through financial system and into the real economy was deep and unprecedented and the crisis forced central banks in advanced economies to undertake a crisis management role along with their respective governments. Central banks in advanced economies embarked on unprecedented measures such as reducing their policy rates to a zero lower bound, while also adopting forward guidance to help reduce medium-term rates.

Quantitative easing was made a priority in developed economies to prevent the financial crisis from sparking a deflationary spiral which would have even more serious spill-overs into the real economy, both locally and abroad. The implementation of quantitative easing and other credit programmes led to a sharp expansion in the size and composition of balance sheets in key advanced economies. The Fed, for example, saw its balance sheet grow from USD850 billion in mid-2007 to around USD 4,0 trillion at the end of 2013, while other major central banks also expanded their balance sheets quite considerably.

One of the key causes of the financial crisis is low interest rates. It has often been argued that US policy rates having been kept too low for too long was responsible for the sharp increase in demand for mortgage loans, thereby inflating house prices in the US. Another widely held view is that global current account imbalances contributed to the crisis. Excess savings over investment in emerging market countries, such as China, led to current account surpluses, which investors channelled to deficit countries such as the US. This led to looser credit conditions, hence lower interest rates, thereby fuelling the US credit boom.

Other reasons cited as causes of the crisis included the failure of financial regulation, the introduction of financial innovation that led to increased complexity

of products; the mispricing of risk and inadequate risk assessment by credit rating agencies; compensation-driven incentives and greed which encouraged risk taking and inadequate supervision and regulation of shadow banks. Many newly innovated securitisation products were accompanied by unknown risks which regulators failed to identify, measure or mitigate in terms of their impact on the overall stability of the financial system. Regulators were blamed for being too preoccupied with the formal banking sector and ignorant of the risks accumulating in the shadow banking system.

The global financial crisis questioned the effectiveness of monetary policy with just one objective (price stability) and one instrument (the policy interest rate). The main lesson learnt from the crisis was the important need for financial stability (macroprudential oversight) to be recognised as an additional central bank mandate, to mitigate the build-up of systemic risk in the financial system. It became a priority for central banks on a global level to establish prudent macroprudential policy frameworks to improve the resilience of the financial system.

Since the crisis, various jurisdictions have come up with definitions of macroprudential policy and financial stability. For example, the G20 and IMF describe macroprudential policy as the deployment of prudential tools to limit systemic risk and minimise disruptions or market distress in the financial system that could have adverse consequences for the real economy.

Similarly, the SARB refers to financial stability as a situation where the financial system is resilient to systemic shocks, facilitates efficient financial intermediation, and mitigates the macroeconomic costs of disruptions in such a way that confidence in the system is maintained. In this regard, financial stability is not an end in itself but, like price stability, is generally regarded as an important precondition for sustainable long-term economic growth and job creation. Interestingly, the SARB describes financial instability as ultimately becoming visible through systemic risk, banking failures, extreme asset-price volatility, interest and exchange rate volatility, and a collapse of market liquidity.

Accordingly, this manifests into a disruption of the payment and settlement system.

An important concept in the above-mentioned definitions is “systemic risk”, which refers to the risk that a shock will cause damage to the financial system in its entirety. Systemic risk, which typically has spillover effects to the real economy, has two key dimensions, namely, a time dimension and a cross-sectional dimension. The time dimension reflects the build-up of systemic risk during cyclical upswings when agents underestimate the risks they are taking (known as procyclicality), therefore threatening financial instability. In this dimension, macroprudential instruments play a role in encouraging the build-up of buffers in good economic times to be drawn upon in bad economic times thereby acting as shock absorbers to mitigate financial market distress.

The cross-sectional dimension reflects common (correlated) exposures which can cause a specific shock to spread and become systemic at any given moment in time. The objective of macroprudential tools, in this instance, would be to customise them in accordance with the individual influence on systemic risk as opposed to a microprudential approach, which applies common standards for all institutions that are regulated.

In the South African context, the SARB began adopting financial stability as an additional central bank mandate by applying a macroprudential policy framework to enhance financial system stability. In October 2010, the South African Ministry of Finance announced that the SARB was given a revised mandate which, in addition to its current mandate of price stability, included being responsible for financial stability. South Africa made a commitment to implement a set of regulatory reforms to make the financial sector safer and better. This was outlined in a document entitled “Implementing a Twin Peaks Model of Financial Regulation in South Africa”. The Twin-Peaks model reforms were proposed by the Financial Regulatory Reform Steering Committee (FRRSC), whose main objective was to strengthen the regulatory framework in South Africa. In this regard, the SARB was given the new responsibility of a “systemic regulator”, with its role being the development of a macroprudential policy framework.

The Ministry of Finance and SARB also created a joint task team, which included members of the SARB, the National Treasury and the Financial Service Board to implement an explicit financial stability mandate within an appropriate macroprudential framework in the SARB. It is envisaged that the SARB's new role as "systemic regulator" will include both the oversight and maintenance of stability functions. The macroprudential framework would encompass identifying and mitigating systemic risk in the financial system through the monitoring and analysis of financial and economic variables that could affect financial stability. In recent years, other key global central banks such as those of the Netherlands, Australia and UK have successfully implemented the "Twin Peaks" model of financial regulation, while South Africa is close to finalising its macroprudential policy framework.

In this regard, the objective of a macroprudential policy framework is to establish a more robust and less pro-cyclical financial system that promotes balanced and sustainable economic growth. This could be achieved by designing macroprudential instruments that respond to developments in the financial cycle to either mitigate the financial cycle or improve the economy's resilience to it. One of the biggest challenges facing policymakers is deciding on how to choose and apply macroprudential instruments. The choice of macroprudential instruments is largely dependent on a country's institutional arrangements, its financial and economic conditions, prevailing law and market practices as well as the types of systemic risks that exist in the financial system.

Due to the fact that there is no single instrument that influences the behaviour of all financial institutions consistently, central banks introduced a range of macroprudential instruments. These are classified under credit-related measures, liquidity-related measures and capital-related measures. The credit-related measures discussed in the study include maximum loan-to-value, loan-to-income and debt-to-income ratios and minimum haircuts/margins on secured lending. Liquidity-related measures include limits on net open currency positions/currency mismatches, limits on maturity mismatches, minimum reserve requirements and minimum liquidity funding ratios (in the context of Basel III requirements, this

would include the minimum liquidity coverage ratio and net stable funding ratio). Thirdly, capital-related measures consist of countercyclical capital buffers, leverage ratios, capital add-ons for global systemically important banks and dynamic loan provisioning.

The countercyclical capital buffer was designed by the Basel Committee to prevent procyclicality in the banking sector by imposing requirements on banks to have adequate levels of capital to withstand economic and financial shocks. The Basel III framework requires that banks hold a buffer that ranges between zero and 2,5 per cent to total risk-weighted assets. In addition, the national authority is allowed to impose a buffer in excess of 2,5 per cent (in line with national policy) for domestically domiciled banks.

For South Africa, the SARB indicated that the planned date for the implementation of the countercyclical capital buffer was 1 January 2016. In accordance with Basel III requirements, the maximum countercyclical capital buffer will start at 0,625 per cent of risk-weighted assets on 1 January 2016 and increase each subsequent year by an additional 0,625 percentage points, to reach its final maximum of 2,5 per cent of risk-weighted assets on 1 January 2019.

The BCBS proposed a three-step approach for banks to calculate the countercyclical capital buffer, namely, (i) calculate the aggregate private sector credit-to-GDP ratio; (ii) calculate the credit gap, that is, the gap between the ratio and its trend and ; (iii) transform the credit gap into the guide CCB add-on.

In calculating the CCB, the BCBS proposes the use of a one-sided Hodrick-Prescott filter to establish the trend for the CCB. The deviation of the actual credit-to-GDP ratio from its long-term trend thus established enables a jurisdiction to determine whether or not credit growth is excessive. The Hodrick-Prescott filter is seen as beneficial as it has the tendency to give higher weights to the latest observations, which are more closely related to increased systemic risk at the current point in time, thereby also dealing more effectively with structural breaks.

In the study, the calculation of the countercyclical capital buffer was applied to South Africa. The results indicated that, since 1994, the credit gap had been positive for several sustained periods, exceeding the long-term trend (that is, zero) for the periods 1990-1992, 1998–2000 and 2006-2010. From the end of 2009 onwards, there has been a persistently declining trend in the credit gap, with the gap remaining well below its long-term trend.

Interestingly, the credit gap delivered a strong warning signal for the countercyclical capital buffer add-on from 2006-2010, which one might interpret as excessive credit growth or the build-up of a housing bubble ahead of the 2007-2009 financial crisis. This raises questions on whether there would have been a bursting of the housing bubble in South Africa had there not been a subprime crisis in the United States.

For most other loan categories, the credit gaps either remained well below their long-term trend or fairly closely followed that trend, thereby implying low levels of credit growth or credit growth commensurate with GDP growth. Interestingly, credit growth for “other loans and advances” has remained above its long-term trend since the end of 2012.

In this regard, it is important that the SARB interrogates this category of credit to determine the underlying drivers of growth, given that this category is the largest, making up 41 per cent of total growth. Overall, however, the results of the countercyclical buffer calculation for South Africa indicate that the credit gap remains well below the lower threshold of the buffer add-on for South African banks and there does not appear to be a need to consider a capital add-on for domestic banks at present.

In light of the different types of macroprudential instruments, the use of these instruments relative to the interaction between monetary policy and financial stability has important implications for institutional design. It is imperative that both policies have clear and distinct objectives that need to be co-ordinated in such a way that transparency and accountability are maintained. Monetary policy and financial (micro- and macroprudential) policy interact through the following

channels namely; (i) risk-taking practices of financial institutions; borrowing constraints and the probability of default; (ii) asset-price and exchange-rate externalities and; (iii) the stage of the financial cycle.

Whilst accommodative monetary policy might be useful for boosting economic growth during periods of low growth, in times of asymmetric information, this could give rise to additional incentives for banks to take on more risk. This would pose a threat to financial stability as asset price bubbles and imbalances build up. Loose monetary policy also tends to result in a relaxation in collateral constraints as asset prices rise and a borrower's net worth increases, resulting in lower external financing costs which represent an easing in overall credit conditions. Conversely, when interest rates rise, debt-servicing costs increase, negatively affecting a borrower's ability to repay a loan, and possibly leading to higher levels of debt default and financial instability.

Monetary policy also affects asset prices and ultimately exchange rates via the value of collateral which influences borrowing by consumers. Long periods of low interest rates and resulting inflated asset prices, encourage banks to provide even more credit, thereby leading to more increases in the value of assets. Conversely, higher interest rates could lead to tighter collateral constraints and excessive levels of capital inflows, thereby resulting in appreciating exchange rates and higher levels of borrowing in foreign currency. These factors would place downward pressure on the exchange rate and destabilise the financial system in the event of a disorderly unwinding of currency positions or capital flows.

The stage of a financial cycle is an important determinant of the type of measures to deploy. For example, both monetary policy and financial stability measures can be adopted during an economic upswing to encourage banks to build up capital and liquidity buffers. On the one hand, microprudential indicators could be used to analyse banks' credit standards and loan provisioning while on the other hand, macroprudential supervisors would use the necessary instruments to monitor risks that are systemic in nature. This type of scenario is known as the "paradox of financial instability", because the financial system appears to be at its strongest when it can be at its most vulnerable. Similarly, during an economic downturn,

macroprudential authorities aim to ensure the stability of the financial system as a whole, while the concern of microprudential authorities is to ensure the stability of individual financial institutions.

The study also looked at two opposing views from the Reserve Bank of New Zealand ("clean" and "lean") on whether it is appropriate to tighten monetary policy to enhance financial stability during periods of credit or asset price booms. The "clean" view proposes that monetary policy should respond to asset price and credit booms only to the extent that they impact on expected inflation outcomes. Under this scenario, the use of macroprudential instruments could be deployed to minimise losses in the financial system and prevent financial instability by providing early warning signals on future crises.

The "lean" view proposes that monetary policy should lean against credit booms for financial stability purposes, with its main objective being longer term price stability. In other words, central banks should be incentivised to lean against the building up of asset bubbles ex ante. Higher interest rates can be somewhat effective in limiting an asset price or credit boom without imposing additional costs on the wider economy. Macroprudential instruments, on their own, are insufficient in mitigating the build-up of systemic risk.

Given the above-mentioned interactions between monetary policy and financial stability, it is important that appropriate institutional frameworks and safeguard measures are put in place to enhance the credibility and transparency of both policy objectives. This is particularly relevant for central banks like South Africa, with the dual mandates of price and financial stability.

It would therefore appear that in exploring the causes of, and key lessons learnt from the 2007-2009 global financial crisis, it is evident that macroprudential policy and financial stability are the missing pillars in the policy frameworks of central banks. The various macroprudential instruments and financial stability indicators suggested in the literature confirm that central banks, including the SARB, could benefit from their use thereof, in identifying and mitigating the build-up of systemic risk in the financial system.

6.2 RECOMMENDATIONS FOR FURTHER RESEARCH

The 2007-2009 global financial crisis led to a change in emphasis from price stability by monetary policy to financial stability by macroprudential policy. It became evident that both sets of policies were needed to complement each other to ensure price stability and financial stability. A number of macroprudential instruments have been successfully applied by countries (even before the most recent crisis) to reduce the procyclicality of prior prudential regulation and mitigate systemic risks in the financial system. Examples of such countries include Ireland, Norway, Hong Kong, Korea, Spain, Switzerland, China, Brazil, Indonesia, United Kingdom, United States and Canada.

It is important that jurisdictions, including the SARB, should use additional financial or economic EWIs to help reduce bank losses associated with banking crises by detecting possible crises and providing guidance to the national authority on the application of the CCB. While South Africa has already identified a set of EWIs, lessons may still be drawn from the experience of countries that have implemented different EWIs such as the Switzerland, Norway, the UK and Hong Kong. Such indicators include macroeconomic variables (real GDP growth, aggregate real credit growth, asset price growth), banking sector activity variables (bank credit growth, banking sector profits, aggregate losses, debt service ratios) and cost of funding variables (banking sector credit spread indices, cost of liquidity, corporate bond spreads). Other early warning indicators that could be researched include leverage ratios, wholesale funding ratios and current-account deficits.

Although the CCB is widely viewed as being a reliable indicator of excessive credit growth, concerns have been raised about whether the credit-to-GDP gap can accurately identify periods of excessive credit growth. Ideally, all financial indicators should be positively correlated with the financial cycle to enable capital buffers to act as a “common reference point” for building up capital buffers during financial booms and releasing capital buffers during financial busts. This study, however, has noted that the majority of financial indicators are indeed positively

correlated with GDP, with the exception of the credit gap which has a negative correlation with GDP. This negative correlation with GDP raises concerns as it implies that capital buffers should be reduced when GDP growth is high and increased when GDP growth is low. This has implications for the timing of the release or withdrawal of the CCB add-on.

In this regard, the SARB should be aware that the credit-to-GDP ratio could possibly be affected by cyclical slowdowns or declines in GDP growth and not necessarily excessive credit growth all the time. It is proposed that the SARB considers calculating the deviation in credit growth from its long-term trend to determine if there is a correlation between credit extension and the financial cycle.

Finally, another challenge with using the credit gap is measurement problems of the HP filter. Critics have pointed out that data revisions to the real-time South Africa credit gap mostly emanate from new data points as they become available. There is a small amount of revisions that take place, which could possibly place question marks around the unreliability in the credit gap. However, studies have indicated that the credit gap is a reliable indicator if applied to at least ten years of economic data (40 quarterly data points). Furthermore, any source of unreliability derived from updated data points can be resolved by the SARB considering more frequent revisions to GDP and other key indicators.

APPENDIX I

IMPLEMENTATION DEADLINES FOR BASEL III REQUIREMENTS

	2011	2012	2013	2014	2015	2016	2017	2018	As of Jan, 1 2019
Leverage ratio	**Supervisory monitoring**		**Parallel run (Jan 1, 2013 – Jan,1 2017)** **Disclosure starts Jan 1, 2015**					**Migration to pillar 1**	
Minimum common equity capital ratio			3,5%	4,0%	4,5%	4,5%	4,5%	4,5%	4,5%
Capital conservation buffer						0,625%	1,25%	1,875%	2,5%
Minimum common equity plus capital conservation buffer			3,5%	4,0%	4,5%	5,125%	5,750%	6,375%	7,0%
Phase-in of deductions from CET1				20%	40%	60%	80%	100%	100%
Minimum Tier 1 capital			4,5%	5,5%	6,0%	6,0%	6,0%	6,0%	6,0%
Minimum total capital			8,0%	8,0%	8,0%	8,0%	8,0%	8,0%	8,0%
Minimum total capital plus conservation buffer			8,0%	8,0%	8,0%	8,625%	9,25%	9,875%	10,5%
Liquidity Coverage Ratio (LCR) – minimum requirement	**Observation period begins**		**Publishing of LCR data**		60%	70%	80%	90%	100%
Net Stable Funding Ratio (NSFR)	**Observation period begins**							**Introduce minimum standard**	

Source: Various BCBS publications

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