

South African Reserve Bank Working Paper

Central bank balance sheet policy in South Africa and its implications for money-market liquidity

N Brink and M Kock

Working Papers describe research in progress and are intended to elicit comments and contribute to debate. The views expressed are those of the author(s) and do not necessarily represent those of the South African Reserve Bank (the Bank) or Bank policy. While every precaution is taken to ensure the accuracy of information, the Bank shall not be liable to any person for inaccurate information or opinions contained herein.



South African Reserve Bank

South African Reserve Bank Working Paper
Research and Financial Stability Departments

**Central bank balance sheet policy in South Africa and its implications for
money-market liquidity**

Prepared by N Brink and M Kock ¹

Authorised for external distribution by Mr B Kahn

December 2009

Abstract

From the introduction of the repurchase-based refinancing system in March 1998, the size of the balance sheet of the South African Reserve Bank (SARB) has increased almost eight times. This balance sheet growth was accompanied by fundamental changes in the structure of assets and liabilities, resulting mainly from the closing out of the oversold forward foreign exchange book of the SARB until 2004, and the accumulation of foreign exchange reserves thereafter.

This paper analyses the impact of the management of the balance sheet of the South African Reserve Bank (SARB) on money-market liquidity conditions in the banking sector. It also discusses a number of implications of trends in the SARB's balance sheet policy, namely the shrinking money-market shortage in real and relative terms, the cost and effectiveness of monetary policy operations, the cost of reserves accumulation, balance sheet implications of alternative funding structures and financial stability considerations relating to the SARB's balance sheet policy.

JEL classification: E52

Keywords: Money-market liquidity, refinancing, monetary operations, monetary aggregates, credit aggregates, balance sheet, central bank, liquidity management, net foreign assets.

Corresponding authors' e-mail addresses: Michael.Kock@resbank.co.za and Nicola.Brink@resbank.co.za

¹ The authors hereby thank Mr C Hugo and Mr H Anderson for their assistance.

Table of Contents

1	Introduction	1
2	Tactical approaches to implementing monetary policy	2
2.1	Interest rate policy	3
2.2	Balance sheet policy	4
2.3	The SARB's refinancing system	5
2.4	A stylised money-market analysis framework.....	6
3	Trends in the SARB's balance sheet.....	7
3.1	Assets	8
3.2	Liabilities	9
3.3	The liquidity requirement or money-market shortage	13
3.4	Summary of structural balance sheet changes.....	13
4	The linkages between the balance sheets of the SARB and the banking sector....	14
4.1	The monetary analysis.....	16
4.2	The monetary base	17
4.3	The expansion of credit and money in the monetary sector	17
4.3.1	Credit extension	18
4.3.2	Money supply	19
4.3.3	Linkages.....	21
5	Some considerations relating to the SARB's balance sheet policy	22
5.1	The shrinking money-market shortage	22
5.2	The net cost of monetary policy operations	24
5.3	The cost of reserves accumulation	25
5.4	Balance sheet implications of alternative funding structures	27
5.5	Central bank balance sheet policy from a financial stability perspective	29
6	Conclusions	30

List of Figures

Figure 1	Composition of SARB assets.....	8
Figure 2	Net other assets.....	9
Figure 3	Composition of SARB liabilities	10
Figure 4	The relative contribution of groups of liquidity-management liabilities.....	12
Figure 5	Liabilities	12
Figure 6	Assets, liabilities and the money-market shortage	13
Figure 7	Required cash reserves as ratio of the monetary base	17
Figure 8	The monetary base and required cash reserves	17
Figure 9	Major credit components of DCE	18
Figure 10	M3 and the monetary base	20
Figure 11	The relationship between the monetary base and money supply aggregates.....	20
Figure 12	Broad money supply and credit extension	20
Figure 13	Interaction between central bank and banking sector balance sheets	21
Figure 14	The liquidity and cash reserve requirement.....	23
Figure 15	Liquidity requirement as a ratio of banks' balance sheets	23
Figure 16	Monetary operations and liquidity provided	25
Figure 17	SARB's net monthly interest income (+) or cost (-).....	25
Figure 18	Net foreign and domestic assets	26
Figure 19	Impact of alternative funding structures.....	28

List of Tables

Table 1	Rules of thumb interpretation of changes in central bank assets and liabilities	7
Table 2	Structural changes in the SARB's balance sheet: 1998 to 2009	14
Table 3	Consolidated balance sheet of the monetary sector.....	16
Table 4	Monetary analysis.....	16

1 Introduction

From the introduction of the repurchase-based refinancing system in March 1998, the size of the balance sheet of the South African Reserve Bank (SARB) has increased almost eight times. This balance sheet growth was accompanied by fundamental changes in the structure of assets and liabilities, resulting mainly from the closing out of the oversold forward foreign exchange book of the SARB until 2004, and the accumulation of foreign exchange reserves thereafter.

This paper analyses the impact of the management of the balance sheet of the South African Reserve Bank (SARB) on money-market liquidity conditions in the banking sector. The SARB has a monopolistic influence on money-market liquidity through transactions that it conducts with domestic banks. While the repurchase rate (repo) is regarded as the SARB's key interest rate policy instrument, there are also some policy implications inherent in its market operations, as reflected in changes on its balance sheet. The ultimate purpose of these analyses is to contribute to a better understanding of the broader implications of the SARB's operations on money-market liquidity conditions in the banking system and, ultimately, the economy.

Interventions by central banks during the global financial crisis that started in 2007 have re-confirmed the role of liquidity management as an active policy instrument. Borio (2009) states that, prior to the crisis, the major central banks have concentrated on their policy rate as primary monetary policy instrument, and liquidity management played a pure technical and supportive role. A focus on the management of money-market liquidity as a policy instrument re-emerged with the introduction of a number of interventions aimed at directly influencing liquidity conditions in the money market - what he refers to as central bank "balance sheet policies". As the financial crisis rendered interest rates ineffective in various advanced economies, their central banks reverted back to their ability to influence liquidity conditions as a key policy instrument. The Bank of England was one of the most explicit central banks in this regard, making the amount of liquidity that it injects in to money market (or the amount of 'quantitative easing') an separate voting issue in meetings of its Monetary Policy Committee (MPC) (Brink & Kock, 2009).

The SARB applies an interest rate policy and regards the repo rate as its key policy instrument. In terms of its current approach, liquidity management is not treated as a policy instrument in monetary policy implementation, but is aimed at maintaining a liquidity shortage in the money market through which to make the repo rate effective. It does not strategically target a specific balance sheet size or structure. This paper argues that liquidity management as encapsulated in balance sheet policy by the SARB also has a direct impact on broader money-market liquidity, credit growth and money supply, and as such should be recognized and applied as complimentary to interest rate policy as part of the monetary policy implementation framework.

The paper is structured as follows. Section 2 provides background on the tactical approaches of central banks in implementing monetary policy, followed by an overview of the SARB's operational refinancing framework and the main drivers on money-market liquidity from the perspective of the SARB's balance sheet. Section 3 analyses the trends in the SARB's balance sheet since the introduction of the repurchase-based refinancing system in 1998. Section 4 describes the concepts and analyses the monetary and credit identities and aggregates that theoretically link the monetary authority's balance sheet to those of private sector banks. Section 5 highlights a number of possible implications of changes in the size and composition of the SARB's balance sheet. Section 6 contains possible alternatives that could be considered, and a summary of the most important conclusions.

2 Tactical approaches to implementing monetary policy

Central banks can choose between different tactical approaches to implement monetary policy in order to achieve strategic objectives. Their policy instruments can be divided into two broad categories, namely interest rate policy and balance sheet (or liquidity management) policy (Borio, 2009). This section highlights the mainstream generic tactical strategic approaches in terms of refinancing systems, followed by an overview of the operational refinancing framework as applied by the SARB.

2.1 Interest rate policy

At a strategic tactical level, the implementation of monetary policy involves processes and procedures followed to give effect to the central bank's policy interest rate, i.e. to ensure that whenever the policy interest rate is changed (increase or decrease), short-term market interest rates also change accordingly.

Central banks in industrial countries and most emerging-market countries implement monetary policy through market-oriented financial instruments aimed at influencing short-term interest rates as operational targets. Central banks do so largely by assessing the conditions that will result in a balance between the supply and demand for bank reserves¹ in the money market. This requires the absorption or neutralisation of any imbalances in the supply and demand of bank reserves, and is generally achieved through one of two main generic strategic approaches.

The policy rate of a central bank can either be a targeted market rate or the rate that the central bank charges. In the first case, the central bank determines a target level for the overnight interest rate at which major financial institutions borrow and lend one-day (or overnight) funds among themselves. In order to ensure that the inter-bank interest rate is close to the target level or within the target band, a central bank can intervene during the day to influence the supply of and demand for bank reserves, and also apply penalty deposit and lending interest rates on end-of-day balances. Different variations of this strategy are followed in most of the advanced economies. Such a system, among other things, requires a well-functioning, liquid and competitive inter-bank market.

In the second case, the policy interest rate is the interest rate charged by the central bank on overnight lending facilities provided to private sector banks². The central bank creates a shortage of bank reserves³ in the money market through levying a cash reserve requirement and draining liquidity through open-market operations, and

¹ Bank reserves are the private banking sector's deposits with the central bank which are held for statutory compliance (i.e. statutory cash reserves) or operational reasons (working balances to facilitate inter-bank settlement in the form of excess cash reserves or current account balances).

² Countries follow different procedures within this approach, for example collateralised loans or loans under repurchase agreements, as well as various maturities.

³ In South Africa bank reserves do not earn any interest.

then refines the shortage by lending funds to banks at its policy interest rate, i.e. providing liquidity or accommodation. Private sector banks normally charge borrowers lending rates in excess of the policy rate paid to the central bank. This approach is followed by the SARB.

Whatever the approach followed, the success of a central bank's interest rate policy can be measured according to the extent to which it succeeds in influencing other short-term lending and deposit rates (Borio, 2001).

The relevance of the two tactical approaches, in the context of this study, is that the balance sheet of the central bank should reflect the specific approach applied. Generally, a central bank following the second approach, that is to create and refinance a shortage in the money market, does not require a large amount of assets – the key financial asset should be the accommodation provided to banks. On the liability side, it would reflect all the instruments used or issued to create such a shortage. By contrast, a central bank that intervenes actively in the money market to influence liquidity conditions to such an extent that it has an effect on market interest rates, has to have enough assets on its balance sheet with which to trade in the domestic money market. Typically, these central banks would have large amounts of government bonds, Treasury bills and other financial assets that it could sell and buy, either outright or on a repurchase basis.

2.2 Balance sheet policy

Balance sheet policies of central banks are used in combination with their interest rates policies, and have conventionally been intended to make interest rate policies effective, as described in section 2.1. Before the crisis, central banks defined their monetary policy stance exclusively in terms of their policy rates, and liquidity management operations played a purely technical and supportive role. Monetary operations were not intended to contain any information about the monetary policy stance (Borio, 2009).

Since the onset of the crisis in 2007, the major central banks have intervened in extraordinary ways to directly influence the liquidity of financial markets, yields and

prices of specific categories of financial assets and private sector balance sheets (Brink & Kock, 2009). These operations were conducted independently from the central banks' interest rate policy and could, as a matter of fact, be conducted regardless of the level of interest rates, making them an independent category of policy instruments available to central banks (Borio, 2009).

Balance sheet policies are not new or unconventional: many central banks have used such policies prior to the crisis, for example by intervening in foreign exchange markets. The change that occurred was a renewed recognition that, firstly, a central bank has more policy instruments available than setting policy rates and, secondly, that a central banks can either strengthen or dilute their interest rate policies through their balance sheet policies. Thirdly, balance sheet policies provides a central bank with opportunities to influence liquidity conditions, rates and yields in specific financial market segments and for longer maturities than short-term policy rates. Ideally, the size and composition of a central bank's balance sheet should reflect its mission and objectives, in support of its interest rate policy.

2.3 The SARB's refinancing system

In March 1998, the SARB adopted a repurchase-transaction-based (repo-based) refinancing system. The system was modified in September 2001 and again in May 2005. The SARB provides liquidity to private sector banks through its refinancing system, enabling private sector banks to meet their daily liquidity requirements. In terms of the SARB's monetary policy implementation framework, the SARB creates a liquidity requirement (or shortage) in the money market, which is then refinanced at the repo rate - a fixed interest rate as set by the Monetary Policy Committee (MPC) at its schedule meetings.⁴

The SARB, as the central bank, is the sole creator and destroyer of central bank liquidity in the financial system. The Bank creates (destroys) central bank liquidity by increasing (reducing) its assets or reducing (increasing) its liabilities and maintains such a shortage by ensuring that its liabilities always exceed its assets. The

⁴ The terms "money-market shortage" and "liquidity requirement" are used interchangeably in this paper, with the same meaning.

balancing item on its balance sheet - “Liquidity provided or accommodation to private sector banks” - is therefore equal to the money-market shortage.⁵

The SARB uses a number of instruments, mainly reflected on the liability side of its balance sheet, to ensure that the money market remains in a deficit position. In addition to levying a cash reserve requirement on private sector banks, money-market liquidity draining operations include the issuance of SARB debentures, the conduct of longer-term reverse repo transactions, entering into foreign exchange swap transactions and withdrawing government funds from the commercial banks to put on deposit at the SARB.

The liquidity requirement of the banking sector is funded by the SARB at the main repurchase auctions through the provision of liquidity to the private sector banks by conducting repos in Treasury bills, Land Bank bills, central government bonds, SARB debentures and an approved list of parastatal bonds. There is no official limit on the amount of liquidity provided to individual banks through the SARB’s main refinancing facilities, within reasonable parameters. The price of this funding is, however, determined by the MPC (i.e., the repo rate). When the daily liquidity requirement differs from the amount allotted at the main repo auction, further refinancing are provided by the Bank, through supplementary or standing facility repo auctions, with maturities of one day. In addition private sector banks have access to their own cash-reserve balances at the SARB, subject to adherence to the cash reserve requirement on an average basis over the full maintenance period.

2.4 A stylised money-market analysis framework

The drivers of the money-market shortage can be derived from the central bank balance sheet⁶. The SARB’s balance sheet could be moulded into a stylised money-market analysis framework, which reflects the effect of changes in the composition of the balance sheet of the SARB in terms of liquidity provided (or the money-market shortage).

⁵ This concept is analysed and explained in depth in Sections 3 and 4 of this paper.

⁶ It would be more correct to refer to the consolidated balance sheet of the monetary authority, which would consolidate the balance sheet of the SARB with those of its subsidiaries. However, because most liquidity management operations are conducted by the SARB and not all consolidated information is published, analyses in this paper are based on the balance sheet of the SARB.

Any transaction between the banking sector and the central bank that results in a credit entry into a bank's account at the central bank, results in a creation of new money-market liquidity which, if no further transactions are undertaken, increases the bank's reserve balances with the central bank (i.e. increases the monetary base). Conversely, any transaction between the central bank and the banking sector that results in a debit entry into a bank's account with the central bank reduces the bank's reserve balances with the central bank, thus draining money-market liquidity.

As a rule of thumb, an increase in assets or decrease in liabilities of the SARB will add new liquidity to the money market and, all other things equal, will reduce the money-market shortage. A decrease in assets or increase in liabilities will drain liquidity and increase the money-market shortage. The rule of thumb interpretation of the effect of changes in the assets and liabilities of the monetary authority on the money-market shortage and liquidity provided is summarised in Table 1.

Table 1 Rules of thumb interpretation of changes in central bank assets and liabilities⁷

<p style="text-align: center;">Liabilities</p> <p>↑ increase in liabilities</p> <p>↓ decrease in liabilities</p>	<p>Assets</p> <p>↑ increase in assets</p> <p>↓ decrease in assets</p>	
	<p>Liquidity provided</p> <p>↑ increase in liquidity provided</p> <p>↓ decrease in liquidity provided</p>	<p>Money market effect</p> <p>↑ increase in money market shortage DRAIN LIQUIDITY</p> <p>↓ decrease in money market shortage INJECT LIQUIDITY</p>

3 Trends in the SARB's balance sheet

The size and structure of the SARB's balance sheet changed significantly since the introduction of the repurchase-based refinancing system in March 1998, and in particular since the end of 2004. Based on the identities underlying the money-

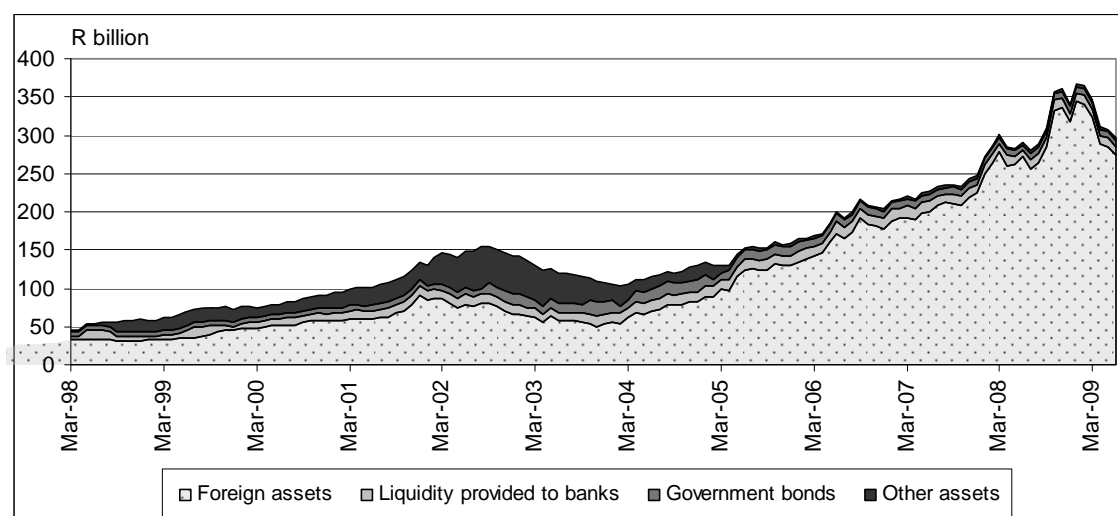
⁷ Under the assumption that all other items remain unchanged.

market analysis and the general rules of thumb, the changes in the structure of the monetary authority's balance sheet, the underlying transactions that caused these changes and the resultant effect on the money-market shortage are explored in this section.

3.1 Assets

The SARB's assets grew almost eightfold from March 1998, with most of the growth recorded from 2004, as shown in Figure 1. The biggest contributor to this growth was an increase in net foreign assets, which have increased by 327 per cent between December 2004 and June 2009.

Figure 1 Composition of SARB assets



Source: SARB Quarterly Bulletin

Foreign assets comprise the gold and foreign exchange reserves holdings of the SARB, as valued at their statutory and market values, respectively. The level of these reserves is largely under the control of the monetary authority, with the exception of some valuation effects, and is therefore regarded as a category of assets with which the SARB can actively influence liquidity conditions.

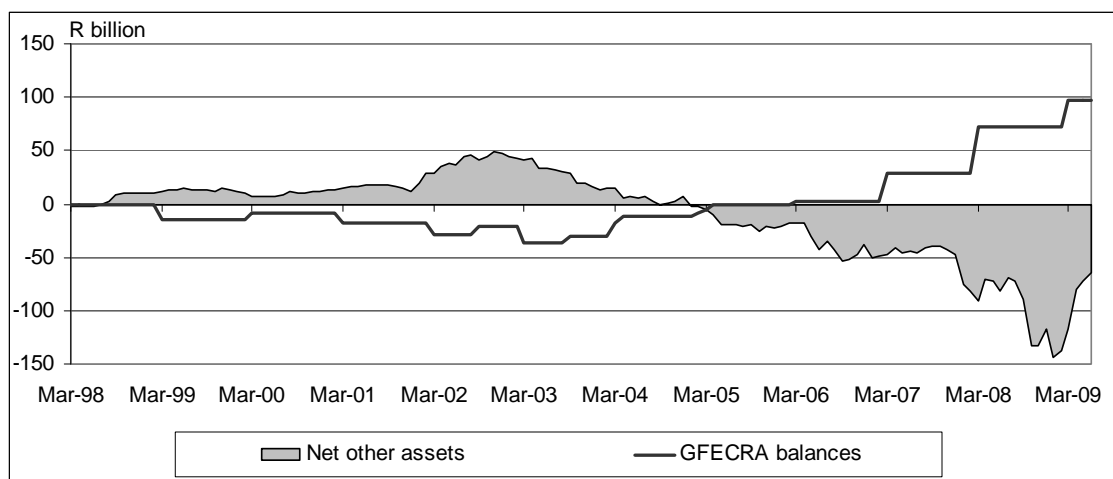
Claims on the government constitute investments in government bonds, Treasury bills, Land Bank bills and promissory notes. Because the SARB is free to increase or decrease the level of these investments through market transactions, these assets

items are also regarded as under the control of the SARB in order to influence liquidity conditions.

Claims on banks comprise liquidity provided in terms of the various facilities of the SARB, namely the main refinancing operations, the SAMOS penalty facility and banks' utilisation of statutory cash reserves. Other assets comprise all other asset items on the SARB's balance sheet.

Figure 2 depicts net other assets, which comprise other liabilities, the gold-and-foreign-exchange contingency reserve account (GFECRA) and equity, netted against *other assets*. The largest component of net other assets is the balance in the gold-and foreign-exchange contingency reserve account (GFECRA). It is evident that net other assets fluctuated between being an asset (positive number) and a liability (negative number) with a changing impact on liquidity.

Figure 2 Net other assets

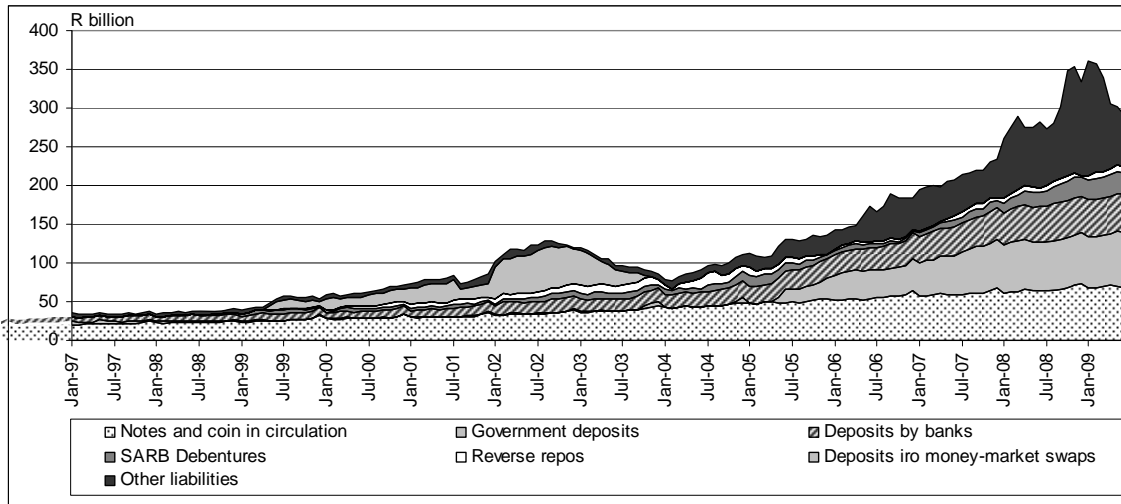


Source: SARB Quarterly Bulletin

3.2 Liabilities

The SARB's liabilities grew commensurate with its assets. Being a central bank, capital constitutes a negligible portion on its balance sheet and asset growth is almost exclusively funded by liabilities, as shown in Figure 3.

Figure 3 Composition of SARB liabilities



Source: SARB Quarterly Bulletin

The SARB funded its asset growth with various types of liabilities, and its liquidity management activities are concentrated on the liability side of its balance sheet. An important distinction can be made between autonomous and non-autonomous liabilities that are available to a central bank to manage liquidity and to fund an increase in its assets. Autonomous factors are those over which the central bank exerts no influence and which are unmanaged. By contrast, non-autonomous factors are those over which the central bank exerts control and that it can actively manage at its discretion to influence liquidity conditions in the money market. These central bank liabilities can be applied to change the size of the liquidity requirement relative to the banking sector's combined balance sheets.

The main types of liabilities of the SARB are the following:

- i. Notes and coin in circulation. The general public's demand for notes and coin naturally tends to increase over time and, all other things equal, leads to an increase in the money-market shortage (draining of liquidity). Notes and coin in circulation is an unmanaged, autonomous or passive liquidity management instrument in the hands of the monetary authority as it is determined by the public's demand.
- ii. Deposits by banks at the SARB, which represents banks' required cash reserves and small amounts of excess cash reserves and other current account deposits.

The SARB does not use the cash reserve requirement as an active liquidity management instrument⁸. Instead, these deposits increase over time in line with the increase in the total liabilities of the private banking sector, which, in isolation, would lead to an increase in the money-market shortage (draining liquidity). As such, deposits by banks could be regarded as an unmanaged, autonomous, or passive liquidity management instrument. Together, notes and coin in circulation and bank reserves comprise the monetary base.

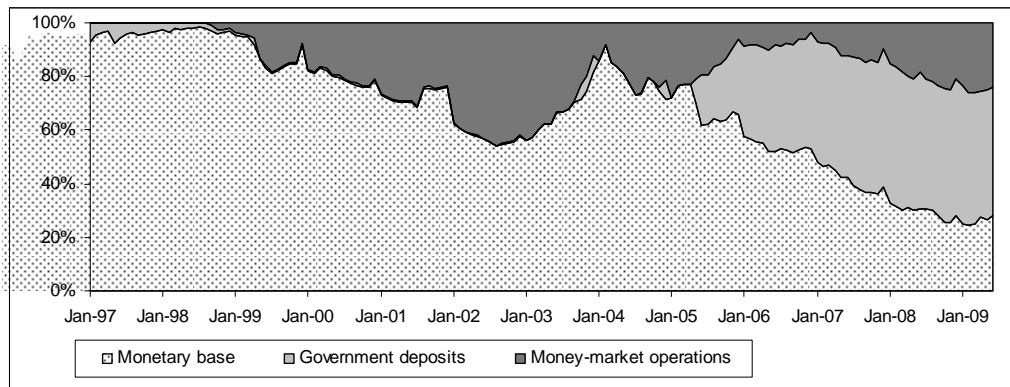
- iii. Government deposits, which partly result from the function of the central bank as banker of the government, as reflected in the Exchequer and Paymaster General (PMG) and government deposit accounts. Since 2005, most of these deposits were a result of assistance by the government to fund the SARB's purchases of foreign exchange. An increase in government deposits with the monetary authority drains liquidity from the money market by diverting these funds away from the Tax and Loan accounts at private sector banks. Public sector deposits with the monetary authority are under the control of the government in co-operation or consultation with the SARB and, as such, could be classified as semi-autonomous liquidity management instruments.
- iv. Money-market operations, which comprise mainly SARB debentures and longer-term reverse repurchase transactions used to drain liquidity from the money market.⁹ The level of these liabilities is under the full control of the SARB and therefore classified as managed, non-autonomous or active liquidity management instruments.

It is evident from Figure 4 that that the monetary base has historically been the most important sub-group of instruments influencing liquidity. The monetary base represents two 'free' sources of funding for the SARB, namely notes and coin in circulation and banks' cash reserve deposits, which are non-interest bearing. These sources of funding also constitute the monetary liabilities of the SARB.

⁸ The last change to the cash reserve ratio was made in 2001, when the qualifying of vault cash as part of banks' cash reserves was phased out over a period of four years.

⁹ Between 1999 and 2004, the SARB also used special deposits in respect of money-market swaps as part of its monetary operations. These transactions have all expired and are no longer used.

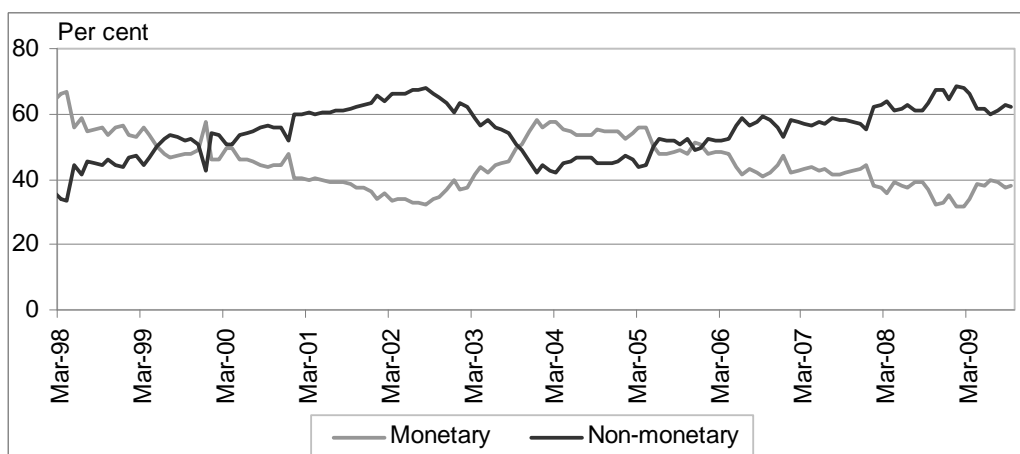
Figure 4 The relative contribution of groups of liquidity-management liabilities



Source: SARB Quarterly Bulletin

Although the monetary base increased by R88 billion between March 1998 and June 2009, its relative contribution to SARB funding diminished as a result of a greater reliance on government deposits as a source of funding since 2005. For the same reason, market operations also diminished in importance. The increasing reliance on government deposits represents a shift away from monetary to non-monetary liabilities (Figure 5). Combined with the declining importance of money-market operations in relative terms, it also represents a shift from non-autonomous to semi-/autonomous liquidity management instruments, potentially implying less control by the SARB over the sources of its funding.

Figure 5 Liabilities

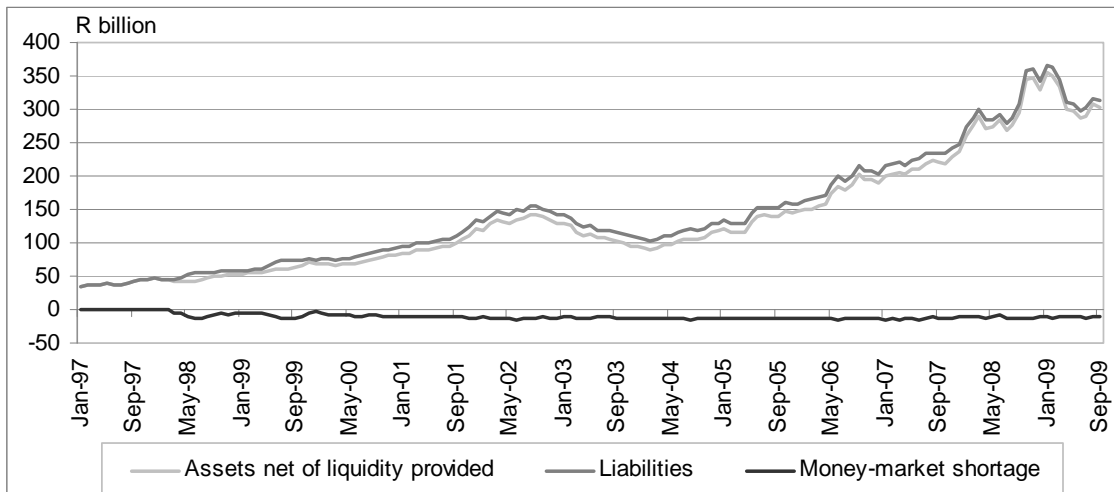


Source: SARB Quarterly Bulletin

3.3 The liquidity requirement or money-market shortage

The SARB's actions, as reflected by the composition of its balance sheet and changes therein, results in an overall injection or drainage of liquidity in the money market, which is reflected in the size of the money-market shortage and the amount of liquidity provided by the SARB. As shown in Figure 6, the SARB's balance sheet grew quite strongly, with liquidity management liabilities always slightly in excess of total assets under management. This shortage-based system, by design, continuously leaves the money market in a short position.

Figure 6 Assets, liabilities and the money-market shortage



Source: SARB Quarterly Bulletin

It is by accommodating or refinancing this shortage that the SARB ought to acquire control over short-term interest rates, from where it cascades to the rest of the banking sector, the financial markets and the economy as a whole.

3.4 Summary of structural balance sheet changes

From the analyses in the previous sections, it is evident that the strong growth and structural changes in the composition of the SARB's balance sheet had a pronounced impact on both the creation and ultimate funding of the money-market shortage. The structural changes forthcoming from the analysis are summarised in Table 2.

Table 2 Structural changes in the SARB's balance sheet: 1998 to 2009

	March 1998		March 2009	
	R billions	% of assets	R billions	% of assets
Total assets	45.6	100	345.6	100
Foreign assets	32.8	72.0	323.6	93.6
<i>Net foreign assets</i>	23.6	51.8	317.4	91.8
Domestic assets	12.8	17.8	22.0	6.4
<i>Liquidity provided (Money-market shortage)</i>	4.5	9.9	10.3	3.0
Total capital and liabilities	45.6	100	345.6	100
Foreign liabilities	9.2	20.2	6.2	1.2
Monetary base	30.2	66.2	116.5	33.7
<i>Notes and coin in circulation</i>	23.0	50.4	69.0	20.0
<i>Cash reserves held at the SARB</i>	7.2	15.8	47.5	13.7
Public sector deposits	1.9	4.2	66.3	19.2
Money market operations	0	0	35.6	10.3
<i>SARB Debentures</i>	0	0	28.1	8.1
<i>Longer-term reverse repo's</i>	0	0	7.5	2.2
Capital and other liabilities ¹⁰	4.3		121.0	
Memorandum items:				
Monetary liabilities	30.2	66.2	116.5	33.7
Non-monetary liabilities	15.4	33.8	229.1	66.3
Non-autonomous funding	0	0	35.6	10.3
Semi-autonomous funding	11.1	24.0	72.5	21.0
Autonomous funding	30.2	66.2	116.5	33.7

Source: SARB

Note: Memorandum items do not add to totals because other assets and liabilities (comprising mainly the GFCRA) are excluded.

In summary, between 1998 and 2009, the SARB's foreign assets have become much more dominant and the relative importance of domestic assets declined. Liabilities have become more non-monetary and semi-/autonomous in nature.

4 The linkages between the balance sheets of the SARB and the banking sector

This section describes the monetary and credit identities and aggregates that link the management of the central bank's balance sheet to the private banking sector.

The most distinguishing characteristics of a central bank are that:

- it issues banknotes and coin;
- it is the sole creator and destroyer of central bank liquidity in the financial system; and
- it has the ability to set the level of short-term interest rates.

Money is central to the activities of the central bank, and the life cycle of fiat money begins with the monetary base. Banks, as part of the monetary sector, expands the scope of fiat money by accepting deposits and extending credit. These deposits are, in turn, convertible into fiat money (notes and coin) at par. Banks are unique in the sense that they are the only institutions authorised by law to take deposits from the public. The consolidated balance sheet of assets and liabilities of the monetary sector forms the basis from which the monetary aggregates and their counterparts, including credit aggregates, are derived.

Theoretically, the amount that banks can lend is constrained by the cash reserve requirement. The cash reserve requirement also puts a limit on the creation of broad money supply through the multiplier effect. The multiplier effect ($1/\text{reserve ratio}$) gives a theoretical indication of the amount of credit that banks can extend from a specific amount of funding (deposits), given a specific cash reserve requirement ratio (r). Other things equal, the higher the reserve ratio, the less credit can be extended.¹¹

It is useful for analyses in following sections in the paper to make a distinction between narrow central bank liquidity and broader market or aggregate liquidity. The former is created and destroyed through transactions between the monetary authority and the banking sector, which result in changes in banks' balances with the monetary authority. The latter refers to the ease with which banks can fund growth in their assets. Specifically, Adrian and Shin (2008) defines aggregate market liquidity as the rate of growth in the aggregate balance sheets of financial institutions, and found in their study that aggregate liquidity is strongly pro-cyclical. If the growth in banks' balance sheets consistently exceeds that of other sectors of the economy, a situation of surplus market liquidity exists, implying easier monetary conditions.

In this section, the relationships and linkages between the various identities and aggregates within and across institutions are derived. The description of the concepts and analyses of monetary and credit identities and aggregates focuses on money, the monetary base, the monetary sector, monetary aggregates, monetary analysis

¹⁰ Includes foreign exchange valuation effects as part of the GFECRA.

¹¹ In practice, the constraint that cash reserves have on credit and money-supply growth is reduced by the refinancing system of the SARB, in terms of which banks have access to central bank funding for any shortfall. This is discussed later in this section.

and credit aggregates, all of which are central to the links between the balance sheets of the central bank and the banking sector.

4.1 The monetary analysis

The consolidated balance sheet of the monetary sector forms the basis for the monetary analysis, i.e., the counterparts of the monetary aggregates. The counterparts of changes in M3 is derived by moving all liability items on the consolidated monetary sector balance sheet, except the deposit components of M3, to the other side of the balance sheet and subtracting it from the corresponding asset items. These identities statistically explain changes in money supply via the counterparts of money supply, as shown in Tables 3 and 4. It can thus be said that the monetary analysis is an ex post analysis of the counterparts of change in M3 in an accounting sense.

Table 3 Consolidated balance sheet of the monetary sector

<u>Liabilities</u>	<u>Assets</u>	<u>Counterparts</u>
Coin, bank notes ¹⁷ and private sector deposits (M3)	Claims on the private sector	CPS ¹⁹ }
Government deposits	Claims on the government sector	NCG ²⁰ } DCE
Foreign deposits ¹⁸	Claims on the foreign sector	NFA ²¹
Inter-bank deposits	Inter-bank claims	}
Other liabilities	Other assets	} NOA ²²
Capital and reserves		}

Table 4 Monetary analysis

<p>The changes in the following adds up:</p> $M3 = CPS + NCG + NFA + NOA$ <p style="text-align: center;">with</p> $CPS + NCG = \text{Total domestic credit extension (DCE)}$
--

¹⁷ Coin and bank notes in the hands of the public.

¹⁸ Deposits by non-residents with South African banks.

¹⁹ CPS = claims on the private sector.

²⁰ NCG = net claims on the government sector = claims on the government sector minus government deposits.

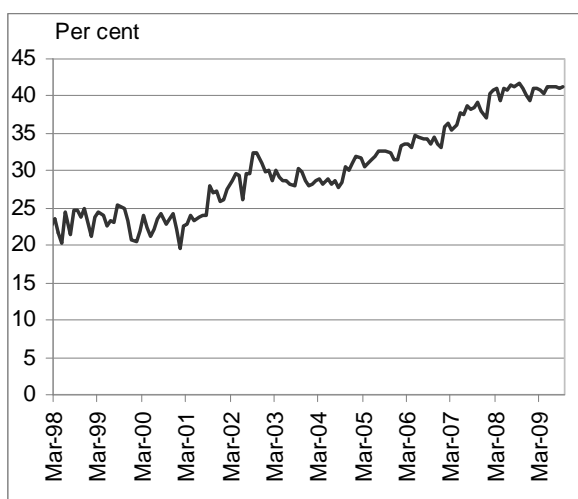
²¹ NFA = net foreign assets = claims on the foreign sector minus foreign deposits including valuation adjustments.

²² NOA = net other assets and liabilities = inter-bank claims minus inter-bank deposits, plus all other assets minus all other liabilities

4.2 The monetary base

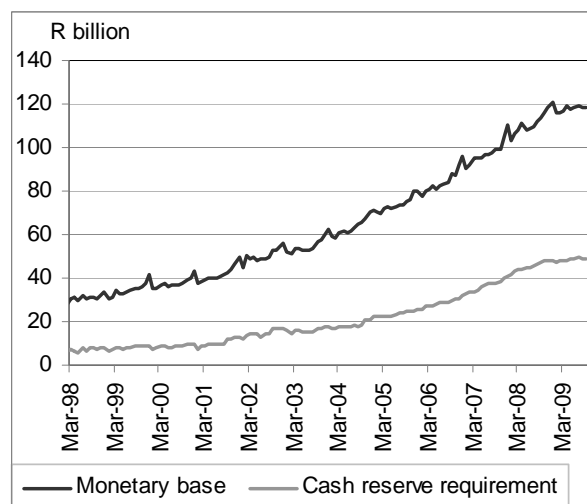
The life cycle of fiat money begins with the monetary base, which consists of notes and coin in circulation outside the SARB and the deposits of banks and mutual banks with the SARB. As shown previously, the monetary base has historically been the most important component of liquidity management on the liability side of the SARB's balance sheet. The overall impact of the increase in the monetary base was mostly brought about by the increase in notes and coin in circulation and the cash reserve requirement deposits by banks. However, of these two components, banks' cash reserves grew relatively faster. As shown in Figure 7, the portion of the monetary base accounted for by required cash reserve holdings doubled from less than 20 per cent in 1998 to almost 40 per cent in 2007 and the monetary base and required cash reserves increased in tandem (Figure 8).

Figure 7 Required cash reserves as ratio of the monetary base



Source: SARB Quarterly Bulletin

Figure 8 The monetary base and required cash reserves



4.3 The expansion of credit and money in the monetary sector

The private banking system expands the scope of fiat money by extending credit through loans and accepting deposits all of which are convertible into fiat money (notes and coin) at par on demand. The consolidated balance sheet of assets and

liabilities of the monetary sector¹² forms the basis from which the monetary aggregates and its counterparts, including credit aggregates, are derived.

4.3.1 Credit extension

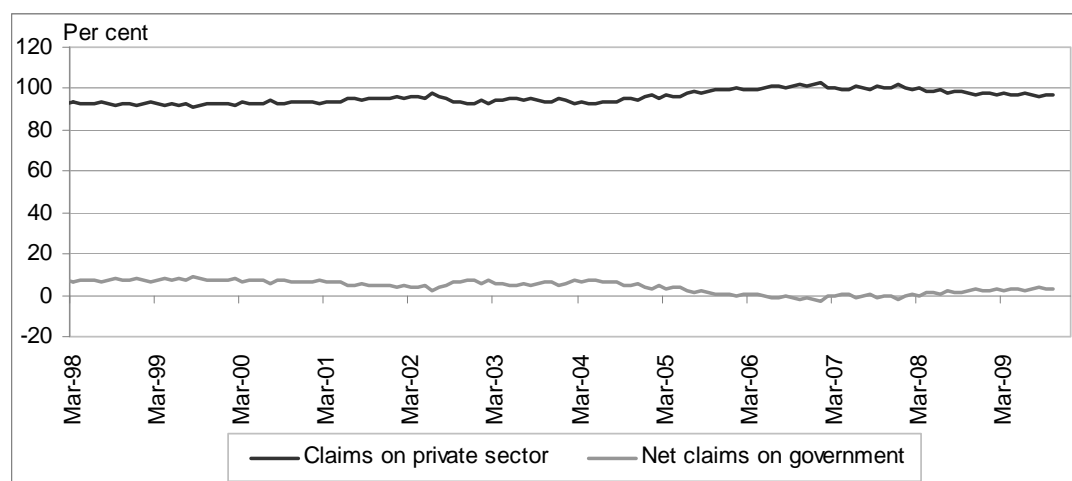
Total domestic credit extension (DCE) is derived from the monetary analysis and consists of a range of credit aggregates, as shown in Table 5.

Table 5 Credit aggregates

Total domestic credit extended	
DCE = CPS + NCG (see the monetary analysis)	
Private sector	
CPS	= Investments + Bills + Total loans and advances
Total loans and advances	= Asset backed credit + Other loans and advances
Asset backed credit	= Instalment sale credit + Leasing finance + Mortgage advances
Other loans and advances	= Overdrafts + Credit card advances + General advances
Government sector	
NCG = Gross claims on the government (GCG) - Government deposits(GD)	

Figure 9 shows that credit extended to the private sector (CPS) is the major contributor to DCE.

Figure 9 Major credit components of DCE



Source: SARB Quarterly Bulletin

¹² The monetary sector consists of the SARB and its subsidiaries, the Land and Agricultural Development Bank of South Africa (Landbank) and the Postbank, as well as all registered private sector banks and mutual banks.

There is a premise that the banking system extends credit on the basis of deposit liabilities and that bank reserves are needed to make loans. However, the level of reserves does not influence lending by private sector banks. Credit extension is a function of banks' willingness to lend based on their risk assessment and their clients' demand for credit (Borio, 2009). Banks' can extend credit without the necessary deposit funding, in which case they borrow the shortfall from the monetary authority which supplies it on demand. The borrowing by private sector banks from the monetary authority is reflected in the net liquidity requirement.

4.3.2 Money supply

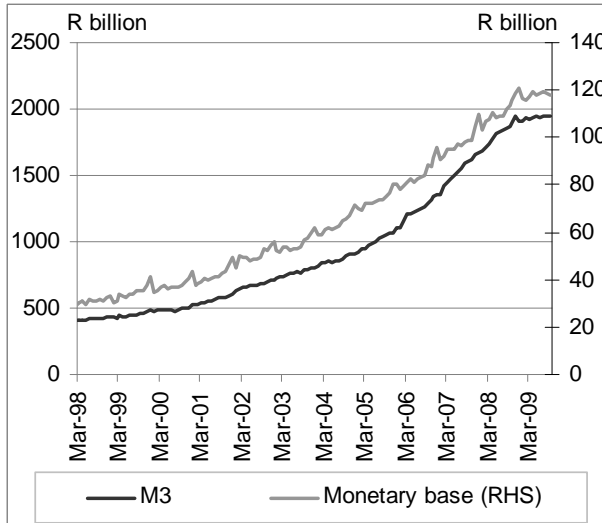
The expansion of broad money is measured by the monetary aggregates, which classifies money in terms of the degree of 'moneyness', based on certain characteristics and liquidity (i.e. the ability to buy or sell a financial asset at short notice at or close to its full market price), as summarised in Table 6.

Table 6 Monetary aggregates comprising money supply

M1A -	Narrow money definition <ul style="list-style-type: none"> o bank notes and coin in circulation outside the monetary sector o plus cheque and transmission accounts of the domestic private sector with monetary institutions
M1 -	M1A plus demand deposits held by the domestic private sector
M2 -	M1 plus other short- and medium-term deposits held by the domestic private sector with monetary institutions
M3 -	Broad definition of money M2 plus long-term deposits held by the domestic private sector with monetary institutions

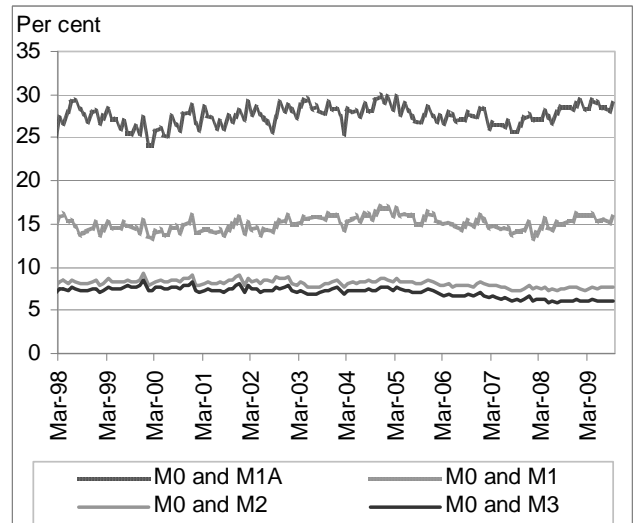
M1A is money defined narrowly and relates to the characteristics of money as a medium of exchange, since all its sub-categories could be used to facilitate payments to third parties. A slightly broader definition is contained in M1, but it still mostly relates to money as a medium of exchange. The M2 definition of money extends somewhat further as the components of money become less liquid. The M3 definition comprises money defined in its broadest sense and is the measure used to assess the relationship between money supply and other macroeconomic aggregates, such as inflation and the structure of interest rates. There is a close and stable long-term relationship between growth in the monetary base and the expansion of broad money supply (Figure 10) and also between the monetary base and the different money supply aggregates (Figure 11).

Figure 10 M3 and the monetary base



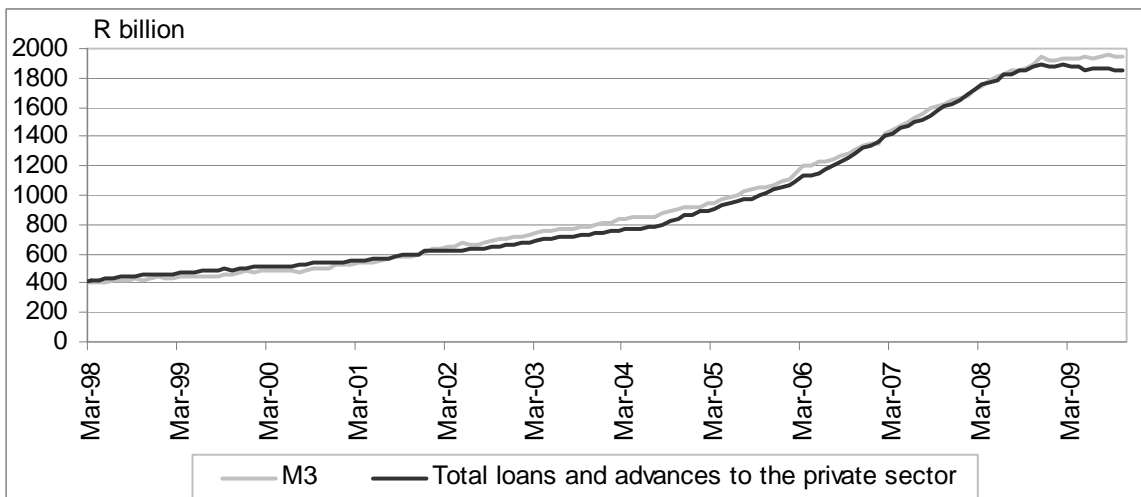
Source: SARB Quarterly Bulletin

Figure 11 The relationship between the monetary base and money supply aggregates



The expansion of broad M3 is also directly related to credit extension and developments in the components of DCE (Figure 12), as credit in the banking system creates its own deposits.

Figure 12 Broad money supply and credit extension



Source: SARB Quarterly Bulletin

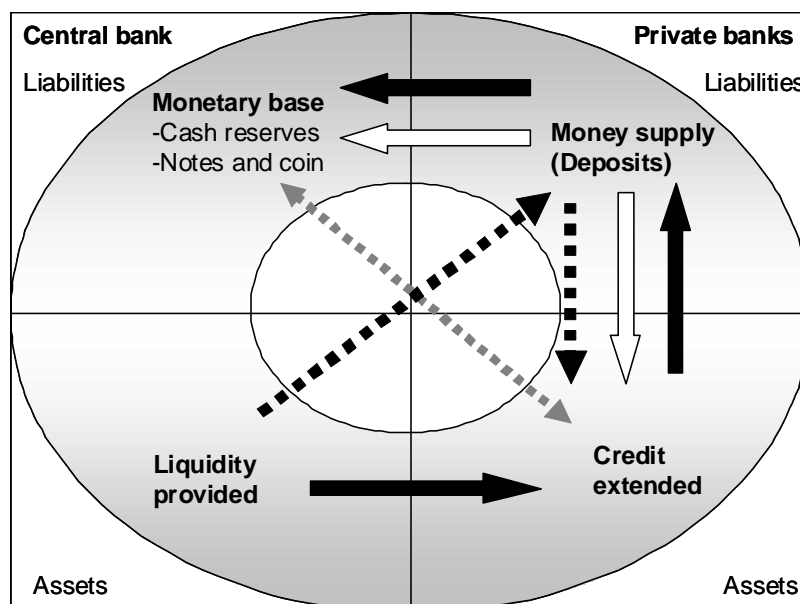
4.3.3 Linkages

This section brings together the theoretical thinking and actual interaction between the balance sheets of the central bank and the banking sector. Theoretically, the life cycle of money begins with the monetary base and credit extension by banks is constrained by the cash reserve requirement. The banking system extends credit on the basis of deposit liabilities, a part of which has to be kept as cash reserves. The cash reserve requirement puts a constraint on the extent to which banks can grant credit, through the multiplier effect. The higher the cash reserve ratio, the lower the rate of credit (and money-supply) growth.

In practice, however, the banking system expands the scope of fiat money by extending credit through loans based on risk assessment and demand, which in turn translates into deposits. Credit provided by one bank, becomes a deposit at the same bank or another bank as soon as the borrower enters into a transaction. This credit extension is not constrained by deposit funding or cash reserves as any shortfall is borrowed from the central bank that provides liquidity. This creates a self-reinforcing cycle.

Figure 13 illustrates the difference in causality between the theoretical and practical interaction between the balance sheets of the central bank and the banking sector.

Figure 13 Interaction between central bank and banking sector balance sheets



The white arrows represent the conventional theory related to the cash reserve requirement and the multiplier effect: Banks source a certain amount of deposits, which enable them to extend credit. However, the amount of credit that can be extended is constrained by the cash reserve requirement. The higher the cash reserve requirement, the less credit banks can extend against a certain amount of deposits.

However, in the context of the SARB's current refinancing framework, the causality works in an opposite direction (the black arrows) and the cash reserve requirement loses its ability to constrain credit extension. Banks extend credit based on the demand, affordability by clients and their own risk appetite (BASA, 2009). These loans evolve into deposits within the banking system, thereby providing new funding and contributing to money supply. A certain amount of cash reserves is held against the deposits, resulting to a funding shortfall for banks, which is funded in full by the SARB at the repo rate. In the absence of any other transactions by the central bank, the amount of liquidity provided would be equal to banks' cash reserves, and grow in relation to the amount of credit and money supply in the economy.

5 Some considerations relating to the SARB's balance sheet policy

5.1 The shrinking money-market shortage

While the liquidity requirement has remained fairly constant in nominal terms, it has been shrinking since 2002 in real terms and relative to the size of commercial banks' balance sheets. The size of private sector banks' consolidated balance sheet has increased by 422 per cent, from R579 billion in March 1998 to R3 022 billion in June 2009. As a result, the liquidity requirement or money-market shortage as a ratio of private sector banks' consolidated balance sheet declined markedly.

For example, until the end of 2001, the liquidity requirement has fluctuated at a level close to the level of the amount of cash reserves that private sector banks had to maintain at the SARB. At the time, this was seen as an appropriate level for the liquidity requirement. However, from mid-2002 there has been a divergence between

the liquidity requirement and the cash reserve requirement, which widened significantly during the past three years, as shown in Figure 14. By June 2009, the liquidity requirement was only 20 per cent of the cash reserves requirement.

Figure 14 The liquidity and cash reserve requirement

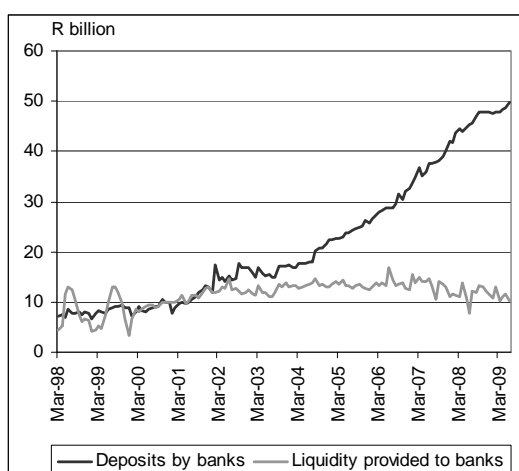
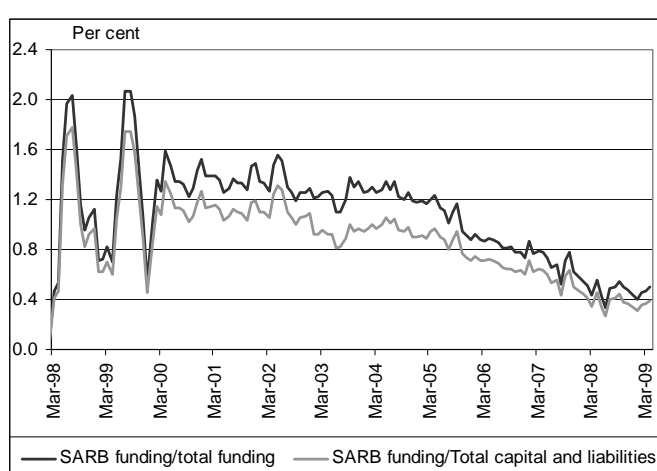


Figure 15 Liquidity requirement as a ratio of banks' balance sheets



Source: SARB Quarterly Bulletin

Figure 14 also links to the arguments made in Section 4.3.3. The fact that the SARB used the increase in the cash reserve requirement to help fund foreign exchange purchases also had an impact on the balance sheet structure of banks. By maintaining the liquidity requirement at a constant nominal level since 2002, the SARB over time reduced the banks' reliance on central bank funding through the refinancing system. This implies that the rand liquidity that was withdrawn as a result of the cash reserve requirement was returned to market in another form, namely by converting banks' foreign exchange assets to rand and using the increase in cash reserves as a source of funding. If the SARB had not used this source of funding, banks' funding shortfall would have been much larger, and their reliance on SARB funding higher. Essentially, the SARB has funded banks' funding shortfall through a different mechanism than the refinancing system.

Figure 15 illustrates how the average ratios of the money-market shortage to banks' total assets and total funding liabilities have changed over time, declining steadily from 2002. Measured in nominal terms, the money-market shortage fluctuated around 1,5 per cent of banks' total funding liabilities between 2000 and 2002, but

subsequently declined to around 0,5 per cent by 2009. Similarly, the ratio of the liquidity requirement to private sector banks' total consolidated balance sheet similarly declined from around 1,2 to around 0,3 per cent over the same period. This ratio is bound to continue declining to even more insignificant ratios for as long as the SARB maintains the money-market shortage within a constant nominal range, while banks' balance sheets continue to grow.

The small size of the money-market shortage relative to banks' balance sheet implies that the SARB has little direct effect on banks' cost of funding, although there is still an indirect impact through the influence that the repo rate has on the money-market yield curve. Increasing the liquidity requirement would not constrain banks' credit growth, because they would only fund a larger shortfall from the SARB. However, it would strengthen the effectiveness of the SARB's interest rate policy, as banks' marginal funding requirements on which they pay repo would be larger. Banks would also have to maintain higher levels of low-yielding eligible collateral to access SARB funding.

5.2 The net cost of monetary policy operations

The SARB maintains a liquidity shortage in the money market in order to make its repo rate effective. To achieve this, it employs various liquidity-draining instruments on the liability side of its balance sheet. Some of these do not carry a direct, rand-denominated interest cost, for example banks' cash reserves, notes and coin in circulation and the government's special deposit to fund reserves accumulation. However, the SARB pays interest on debentures and longer-term reverse repo transactions. Although the SARB maintains a positive interest margin between the interest rate it pays on these instruments and the interest rate it receives from banks in the main refinancing operations (i.e., the repo rate), the amounts involved on the two sides of the balance sheet differ, resulting in either a net income or cost to the SARB.

Figure 16 illustrates how the size of the SARB's non-autonomous liquidity-draining monetary operations (i.e. debentures and longer-term reverse repos) changed relative to the amount of liquidity provided. Since 2007, these operations have increased significantly, while the liquidity requirement stagnated. If one makes the

realistic assumption that the SARB pays on average 30 basis points below repo on its debentures and longer-term reverse repos, the divergence in the magnitudes of the liquidity draining operations and the amount of liquidity provided results in a net cost of monetary policy operations to the SARB since June 2007 (Figure 17).

Figure 16 Monetary operations and liquidity provided

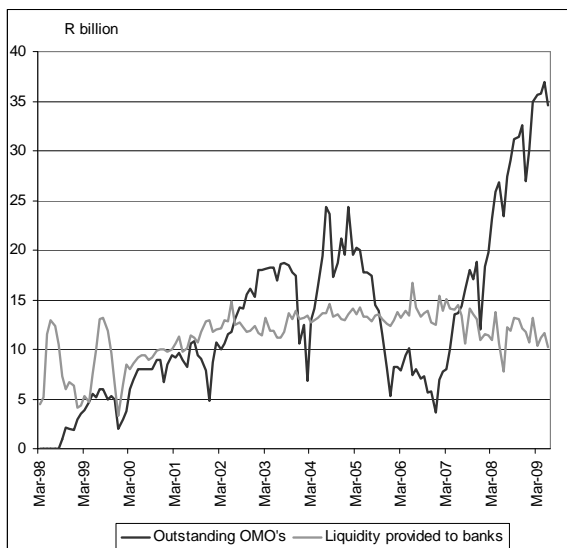
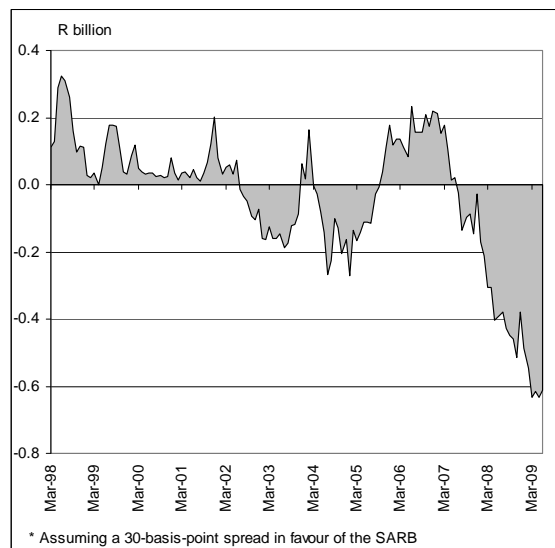


Figure 17 SARB's net monthly interest income (+) or cost (-)



Source: SARB Quarterly Bulletin

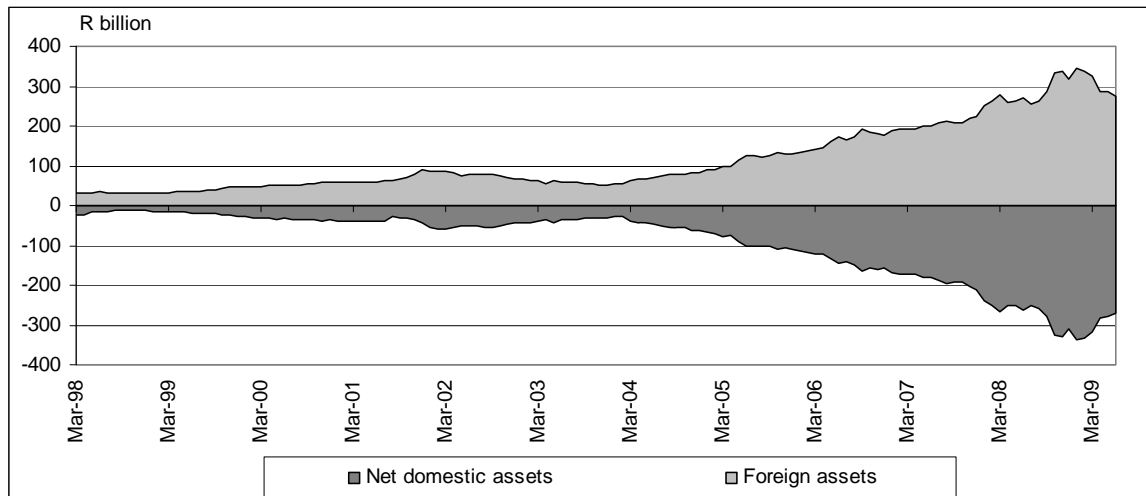
According to this simplified but realistic calculation, the net cost to the SARB totalled just more than R5 billion on a cumulative basis by June 2009. This amount also represents additional liquidity provided to the money market that has to be drained again, fuelling the growing imbalance between liquidity-draining monetary operations and the size of the money-market shortage.

5.3 The cost of reserves accumulation

Although a central bank is not profit-driven, its financial position is important for operational independence and for effective policy formulation and implementation. The importance of central bank financial strength was the topic of a paper by Klüh and Stella (2008), in which the main finding was that there is a negative relationship between central bank financial strength and policy performance, including inflation outcomes.

From this viewpoint, the balance sheet structure has a number of important implications for the SARB's income statement. Figure 18 shows that the significant increase in net foreign assets since 2004 was mirrored by decrease in net domestic assets, confirming that the acquisition of foreign assets was funded by an increase in domestic liabilities.

Figure 18 Net foreign and domestic assets



Source: SARB Quarterly Bulletin

Given the interest rate differentials between South Africa and the major advanced economies, in which foreign assets are predominantly invested, there is a significant negative margin between the portion of the SARB's domestic liabilities on which it pays market-related interest rates, and the return that it earns on the foreign assets on its balance sheet. In addition, the SARB is exposed to significant valuation effects stemming from both currency and interest-rate risk on its foreign assets. In a macroeconomic equilibrium model, the exchange rate changes should compensate for the interest rate differential over the long term. However, this does not protect a single institution, including a central bank, against short-term valuation losses and negative carrying costs.

Another consideration related to the relatively small amount of domestic assets (negative net domestic assets) of the SARB, is that it limits flexibility with regard to its open-market operations, for example expanding its market operations to include active trading in domestic assets.

5.4 Balance sheet implications of alternative funding structures

In South Africa, the period of rapid growth in the central bank's balance sheet - 2004 to 2008 - was also a period of rapid growth in banks' balance sheet, raising the question to which extent the SARB's could have contributed to, or at least facilitated, the growth in banks' balance sheets.

The period between 2004 and 2008 was characterised by generally flush liquidity conditions and low interest rates globally, and the South African economy benefited from significant inflows of foreign currency. These inflows helped the SARB to accumulate reserves: From the time that the oversold forward book was closed out (February 2004) until June 2009, the SARB's foreign exchange reserves increased by about R200 billion, which could be regarded as a rough estimation of the amount of domestic currency that was injected into the money market.¹³

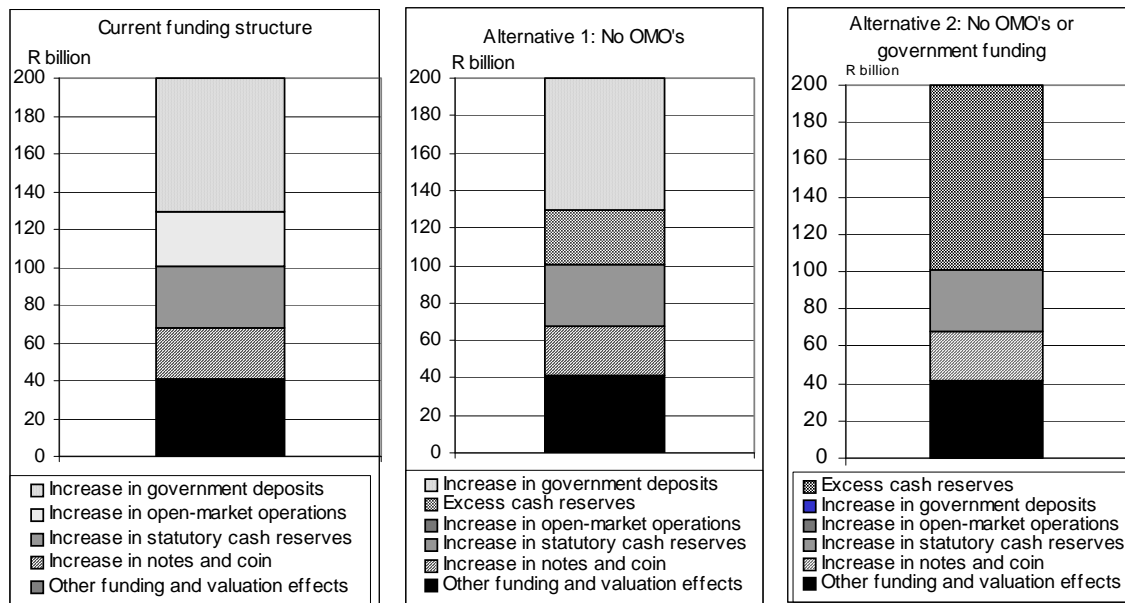
The SARB sterilises the money-market effect of its foreign exchange purchases by increasing its domestic-currency-denominated liabilities. However, rand-denominated liabilities on the balance sheet of the SARB are the counter-entries to rand-denominated assets on the balance sheet of the banking sector, thus still representing growth in its own and banks' balance sheets. The way in which the SARB funds its foreign-exchange purchases (or sterilises them, to use the more familiar terminology), does not destroy the initial liquidity that was created, but has implications for the structure and growth of banks' balance sheets.

Figure 19 illustrates the effects of three alternative funding structures or sterilisation methods for an assumed R200 billion worth of foreign exchange purchases between February 2004 and June 2009. In terms of the current structure, increases in notes and coin and banks' cash reserves provided funding of about R60 billion. In the absence of foreign exchange purchases, these autonomous liabilities would have increased the money-market shortage by a similar amount. In a sense, therefore,

¹³ This is a simplified estimation that does not take account of capitalised yields and valuation effects, and is intended to support the arguments, and does to represent the precise amount, which is not public knowledge. However, given the exchange rate developments over this period, it is not an unreasonable estimation.

using these amounts to fund foreign exchange purchases has contributed to easier money-market liquidity conditions. Both these sources of funding also represent assets on the balance sheets of commercial banks.

Figure 19 Impact of alternative funding structures



The SARB funded about R29 billion of its foreign exchange purchases with additional open-market operations (debentures and reverse-repos), which also represent commercial bank assets. About R70 billion was funded by withdrawing government deposits from the banks' Tax and Loan accounts and depositing it at the SARB. This funding instrument that caused a contraction in commercial banks' balance sheet.

If the SARB had not conducted additional open-market operations to sterilise foreign exchange purchases (Alternative 1), the result would have been an increase in bank reserves in excess of the prevailing statutory requirement. Draining liquidity through debentures and reverse repos directs the increase in banks' assets to investments (buying SARB paper), rather than cash reserves. If no government funding was provided (Alternative 2), banks' cash reserves would have been even larger.

5.5 Central bank balance sheet policy from a financial stability perspective

While central banks have long concentrated on interest rates as their key (and sometimes exclusive) policy instruments, the extraordinary interventions that had to be undertaken during the crisis has once again put the focus on quantitative policies, or what Borio (2009) refers to as balance sheet policies. The breakdown in interbank and credit markets during the crisis rendered interest rates an ineffective policy instruments in various advanced and emerging-market economies, and low interest rates failed to ignite a recovery in credit markets. Various central banks had to revert to policies of injecting central bank liquidity into money markets, or conducting a facilitating or brokering role in financial markets (Brink & Kock, 2009).

Whether intentional or a by-product of other policies, a central bank's balance sheet policy affects economic activity by altering the structure of private sector balance sheets (Borio, 2009). The first and foremost type of private sector balance sheets that are affected are those of the banking sector, which in turn affects general market conditions, lending activity and the real sector. A central bank therefore cannot ignore the impact that its balance sheet policy has on private sector balance sheets.

Aglietta and Scialom (2009) argue that credit markets tend to drift to extremes in close correlation with asset price spikes and slumps. Credit markets are not self-correcting to the extent that product markets are, and tend to move into extremes before they correct, with such corrections often associated with huge costs on society. The reasons for this different behaviour in credit markets, as explained by Aglietta and Scialom, are summarised as follows:

- i. Credit is mostly used to finance asset purchases in expectation of asset price increases in the future. This is also the basis on which credit is extended, making the supply and demand of credit endogenous and interrelated. As the amount of credit increases, asset prices increase and the supply/demand interrelationship sets in motion an upward spiral of credit and asset prices.
- ii. Unlike the market for products, which constitutes an exchange of value, credit markets constitute an exchange of promises. As such, credit does not have a decreasing marginal utility like products: As long as there is an expectation that

asset prices will continue to rise, the demand and supply of credit continues to rise.

- iii. As asset prices increase, risk measurements become more benign, borrowers become more creditworthy, default probabilities decline and risk premia are compressed, which reduces the cost of funding, often in contrast to the direction of policy rates. The rise in asset prices disguises deteriorating credit conditions until it becomes extreme at the apex of a speculative bubble. This creates a risk-taking channel in the transmission of monetary policy that could potentially work in an opposite direction as the central bank's monetary policy stance.

The authors make a strong case for central banks to control excessive growth in credit relative to the real economy. Their views are supported by Adrian and Shin (2008) who argue in a comprehensive study that there is a strong positive relationship between asset prices and changes in banks' balance sheet because banks adjust (grow) their balance sheets as asset prices (net worth) increases. Therefore, they conclude that leverage is strongly pro-cyclical. This makes for an argument that central bank balance sheet policy should be counter-cyclical, i.e. put some damper on banks' balance sheet growth, during exuberant times, which interest rates on their own cannot achieve.

Borio (2009) emphasises that a specific central bank balance sheet policy (which feeds through to general liquidity conditions in the banking system) can be associated with various levels of interest rates, and be decoupled from the interest rate policy of the central bank. However, it should be kept in mind that the central bank's balance sheet policy - whether intentional or not - would either reinforce or dilute the effects of its interest rate policy. This is an evolving area of research to which central banks would have to give renewed strategic attention.

6 **Conclusions**

The central bank's monetary policy framework consists of two components, namely its interest rate policy and its balance sheet policy, which affects the price and quantity of central bank liquidity, respectively. These policies should be applied complementary to and in support of each other. Ideally, the size and composition of a

central bank's balance sheet should reflect its mission and objectives, in support of its interest rate policy.

The size and the structure of the SARB's balance sheet have changed significantly since 2002. Net foreign assets increased about threefold since the beginning of 2004, while net domestic assets turned negative (i.e., domestic liabilities exceed domestic assets). The increase in net foreign assets was funded by a combination of an increase in the monetary base (notes and coin in circulation and banks' cash reserves with the SARB), government deposits and increased issuance of SARB debentures. This funding structure resulted in a relatively greater reliance on non-monetary, autonomous liabilities.

The balance sheet of the SARB is linked to that of the banking sector. The SARB's asset/liability management also has an impact on the size and structure of the banking sector's balance sheet, mainly through the effects of the SARB's reserves accumulation and refinancing operations (SARB assets), as well as the cash reserve requirement and open-market operations (SARB liabilities).

The SARB facilitates growth in the balance sheets of banks through its own transactions, if these contribute to easier money-market conditions, as well as by providing any funding shortfall of banks through its refinancing system. Conventional theory places emphasis on the monetary base and the ability of the cash reserve requirement to constrain credit extension. However, in practice the direction of causality starts with credit extension, which largely creates its own funding in the form of deposits. The cash reserve requirement resulting from these deposits contributes to the money-market shortage, which is fully funded by the SARB. Its influence over other factors affecting money-market liquidity enables the SARB to determine the level of the shortage.

The changes in the SARB's balance sheet since 1998 and its linkages to the banking sector have a number of implications:

- i. Because the SARB funded a significant part of its foreign exchange purchases through the increase in the monetary base (cash reserves and notes and coin in circulation), the liquidity requirement did not grow

proportionally to the growth in banks' balance sheets. The SARB maintained the liquidity requirement within a constant nominal range since 1998. However, the requirement declined in real terms and relative to banks' total funding liabilities. This probably diluted the transmission of the SARB's interest rate policy.

- ii. Since mid-2007, the SARB relied increasingly on debentures as a source of funding for foreign exchange purposes, with no impact on the size of the liquidity requirement. As a result, the amount of the SARB's total liquidity draining operations (debentures and longer-term reverse repos) increased to about three times the size of the liquidity requirement. Despite a favourable interest margin for the SARB between the average cost of these operations and the repo rate earned on its refinancing operations, the increasing difference in amounts resulted in a net interest cost to the SARB, in turn creating additional liquidity.
- iii. The SARB relies on domestic liabilities to fund its acquisition of foreign assets. This results in a negative cost of carry on its foreign exchange reserves, with negative income statement implications.
- iv. The fact that the SARB holds only a relative small amount of domestic assets limits its flexibility with regard to open-market operations, and with regard to balance sheet policy in a broader sense.
- v. The SARB generally refers to its active funding interventions as 'sterilisation'. In the absence of such active interventions, foreign exchange purchases would have been funded by an increase in bank reserves above the statutory requirement, further reducing the liquidity requirement or even resulting in a surplus of liquidity in the money market. However, 'sterilisation' does not reverse the initial growth in the balance sheets of either the SARB, or the banking sector. It also does not destroy the initial liquidity that was created, but affects the asset structure of banks.
- vi. From a financial stability perspective, excess credit growth is a prerequisite for the development of asset bubbles, and credit markets are only self-correcting in the extreme. The central bank could use its balance sheet policy in support of its interest rate policy as an instrument to curb excessive credit extension in a countercyclical manner.

The overall conclusion can be made that a central bank should strategically determine its balance sheet policy, similar to its interest rate policy.

7 References

- Adrian, T & Shin, H.S. 2008. Liquidity and leverage. Federal Reserve Bank of New York and Princeton University.
- Aglietta, M & Scialom, L. 2009. A systemic approach to financial regulation. A European perspective. University of Paris West.
- BASA. See The Banking Association of South Africa.
- BIS Markets Committee. 2007. Monetary policy frameworks and central bank market operations. December 2007.
- Borio, C. 2001. Comparing monetary policy operating procedures across the United States, Japan and the Euro area. BIS Paper no 9.
- Borio, C & Disyatat, P. 2009. Unconventional monetary policies: An appraisal. BIS Paper no 292.
- Brink, N & Kock, M. 2008. The impact of the management of the monetary authority's balance sheet on liquidity and monetary conditions. SARB Discussion Paper DP/08/11.
- Brink, N & Kock M. 2009. Assistance to financial institutions in distress: Implications for central banks. Paper delivered at the 28th SUERF Colloquium: Quest for Stability, Utrecht, September 2009
- De Jager, CJ & Van der Merwe, JJO. The role of the Reserve Bank in the money market shortage. Paper presented at EBM Conference in Pretoria, November.
- Faure, AP. 1995. The Reserve Bank and interest rates. Stellenbosch, February 1995
- IMF. 2000. Monetary and Financial Statistics Manual.
- Klüh, U & Stella, P. 2008. Central bank financial strength and policy performance: An econometric evaluation. IMF Working Paper WP/08/176.
- Mohanty, MS & Turner, P. 2006. Foreign exchange reserves accumulation in emerging markets: what are the domestic implications? Bank of International Settlement Quarterly Review, September 2006.
- Mohr, Van der Merwe, Botha & Inggs. 1988. The practical guide to South African economic indicators. Lexicon publishers.
- Mollentze, SL and Brink, N. 2004. Comparing monetary policy implementation in South Africa and the United States of America. SARB Working Paper WP/04/13.
- Reserve Bank of Australia. 2003. The Reserve Bank's Open Market Operations.
- Schaechter, A. 2001. Implementation of monetary policy and the central bank's balance sheet. IMF Working Paper no.WP/01/149.
- South African Reserve Bank, Quarterly Bulletin, various editions.

Standard Bank of South Africa. July 2008. Discussions with various officials about trends in money-market rates.

¹ Stark, J. 2007. The external dimension of monetary analysis. Speech delivered in Frankfurt am Main, 12 December 2007.

The Banking Association of South Africa. 2009. Contributions to a Technical Committee to review the spread between the repo and prime rate.

Understanding South African Financial Markets, Second Edition, Van Schaik publishers, 2003, C van Zyl, Z Botha, P Skerritt

Van der Walt, SJ, Wesso, GR & Morudu, MD. 1999. The money market in South Africa. Departmental memorandum, Economics Department South African Reserve Bank

Various central bank websites