Consultation paper

A new framework for implementing monetary policy in South Africa

Financial Markets Department

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South African Reserve Bank

Contents

Executive summary

Central banks serve their economies by providing high-quality money that can be used with confidence to make payments. Confidence is created in two ways: by maintaining the value of money with an appropriate monetary policy framework, and ensuring that all economic agents use the same currency. Interest rates are the standard tools used by central banks to implement their frameworks.

In the South African system, the most important policy rate is a short-term interest rate, known as the repurchase rate, or repo rate. The repo rate governs the price of electronic money issued by the central bank, which is held by institutions with South African Reserve Bank (SARB) bank accounts and used for settling payments between banks in the national payment system.

This central bank money is only one, relatively small, part of the total supply of money in the economy. The stock of bank reserves is currently around R120 billion, compared to a broad money supply of approximately R4.1 trillion (using the M3 definition). However, the repo rate has large effects on the prices of other assets and the broader economy, making it a powerful tool. Setting this rate is the task of the SARB's Monetary Policy Committee (MPC).

The role of a monetary policy implementation framework (MPIF), which is the subject of this paper, is to implement the interest rate decisions of the MPC. This is a practical and technical matter, separate to larger questions such as the inflation target or the outlook for the economy. Since 1998, monetary policy in South Africa has been implemented using a classical cash reserve or shortage system whereby the SARB ensures that there are not enough bank reserves circulating in the market by draining excess reserves using various tools, and then lending the missing funds at the repo rate. This framework has functioned reasonably well, but has become less effective with time and is now due to be replaced.

The purpose of this paper is to introduce an alternative framework for implementing monetary policy in South Africa. Based on a review of global practices, the SARB is proposing to adopt a 'tiered floor' system in South Africa. In this framework, rather than creating a shortage, the SARB would allow an excess supply of bank reserves and

then manage this additional liquidity by paying interest on qualifying reserves, at the repo rate. This framework would offer several advantages over the current system. It would provide a superior tool for dealing with excess liquidity, replacing less-efficient instruments currently on the SARB's balance sheet. It would create flexibility for dealing with different stages of the financial cycle and interact more smoothly with regulatory constraints. It would also be a relatively simple mechanism.

The 'tiered' aspect of the new framework means there would be limits on the amounts banks can place at the SARB, with a penalty rate still in place for deposits in excess of bank's individual tiers. These tiers will discourage banks from hoarding excess funds, instead of lending them on to other banks, and will therefore safeguard the SARB from additional reserve demand. Tiered floors have been used in Norway and New Zealand, and represent a modification of the floor system which is better suited to countries like South Africa.

This paper provides a detailed description of the preliminary reform proposal. The SARB welcomes comments, which should be directed to David Fowkes and Khethiwe Mavundla at MPIF-reform@resbank.co.za. Inputs should be sent by the end of February 2022.

1. Introduction

Over the past few years, the SARB has worked on reviewing its framework for implementing monetary policy. The onset of the COVID-19 pandemic has highlighted the urgency of reform, prompting the SARB to accelerate its efforts − a process which has culminated in the reform proposed in this paper. The paper outlines the modern history of monetary policy implementation in South Africa, reviews global practices and describes the reform concept. The aim of this consultation paper is to present the SARB's initial thinking on a new monetary policy implementation framework for South Africa and to obtain inputs from the public.

In adopting a new MPIF, the main choice for the SARB is one between a mid-corridor system and a floor system. The SARB's preliminary analysis suggests that a floor system, augmented with tiers or quotas, would be an appropriate choice for South Africa.[1]

For this framework, rather than the current practice of creating a money market shortage, the SARB would operate an ample-reserve system and pay interest on excess reserves. Banks would be remunerated at the policy rate for reserves beyond their cash reserve requirements, up to the limits established by the quotas. Any additional reserves would be automatically moved to the existing standing facility, at a lower rate (the deposit facility pays at the repurchase (repo) rate less 100 basis points).[2]

In the new framework, the overall payment system would be kept in surplus. This would be achieved mainly through SARB open market operations, with the initial liquidity injection coming from unwinding the liquidity-draining operations that have

[1] For a helpful typology of monetary policy implementation frameworks, see Darryl King and Tommaso Mancini-Griffoli, Chapter 5: Monetary operations, in Tobias Adrian, Douglas Laxton and Maurice Obstfeld, eds, *Advancing the Frontiers of Monetary Policy,* Washington, DC: International Monetary Fund, 2018. See, in particular, p 58; the SARB favours option 4 of this typology.

[2] Bank reserves, also known as settlement balances, are a form of money issued by the central bank in electronic form. They are the final means of payment between banks. Cash requirements are fixed amounts of cash reserves banks are required to hold, in proportion to their liabilities. Standing facilities are SARB lending and borrowing windows, available daily for banks that have too much or too little liquidity to satisfy their reserve requirements and payment needs. Banks are meant to avoid using the standing facilities on a routine basis, for which reason they are only available at punitive rates.

been used to maintain a shortage. There would be no immediate balance sheet expansion.

Despite a liquidity surplus, interbank rates would be expected to track the announced policy rate closely, given the option for banks to place funds with the SARB and earn repo. The quotas would prevent the hoarding of reserves by individual banks, thereby maintaining incentives for interbank lending, and would also constrain undesired growth of the SARB's balance sheet.

The proposed framework offers several advantages over the current shortage system, as well as alternative corridor-style arrangements.[3] The most immediate gain would be a new tool for managing surplus liquidity.[4] By paying interest on excess reserves, the SARB would be able to keep interest rates stable and close to the policy rate despite an abundance of liquidity, without the distortions and additional expense involved in existing sterilisation operations.

A floor-style system would also confer financial stability benefits by expanding the supply of high-quality liquid assets, moving away from the reserve scarcity inherent in corridor-style systems, and would interact better with regulatory changes.

The new framework would furthermore insulate monetary policy transmission from any asset purchase operations that might be required from time to time, as in 2020. (These included purchases of foreign exchange reserves, bond buying to stabilise markets, and participation in the Loan Guarantee Scheme.) It is nonetheless important to note that this reform is not a prelude to quantitative easing (QE), a well-known type of central bank asset purchase which is not required in South Africa.[5]

[3] The advantages discussed here are consistent with the principles of framework design listed in Bindseil (2014), although for the sake of brevity, the discussion here is not framed in terms of his eight objectives. See Ulrich Bindseil, *Monetary policy operations and the financial system,* Oxford University Press, 2014, pp 130-133.

[4] Dawid van Lill, 'Changes in the liquidity effect over time: evidence from four monetary policy regimes', *ERSA Working Paper 704,* August 2017. https://www.econrsa.org/system/files/publications/working_papers/working_paper_704.pdf

[5] As discussed, for instance, in Lesetja Kganyago, 'The South African Reserve Bank, the coronavirus shock, and 'the age of magic money'', 18 June 2020, https://www.resbank.co.za/en/home/publications/publication-detail-pages/speeches/speeches-by-governors/2020/563

Finally, the new framework would be relatively simple and resilient to shocks. This honours the general principle that a simpler system is always preferable to a complex system, and additional complexity is only justified by additional capacity.[6]

A new MPIF, based on a tiered floor system, would require decisions on the interest rate benchmarks used to monitor monetary policy transmission, the role of funding auctions and open market operation tools to inject or drain liquidity, and the design of standing facilities. These arrangements are discussed in detail in this paper.

The SARB is aware that a transition to a new MPIF should take place gradually rather than instantly to facilitate a smooth transition, and should be accompanied by careful communication. The envisaged consultation process will provide an opportunity for all stakeholders to highlight potential transition and other implementation risks. It is important to note that the change in the MPIF will have no implications for the monetary policy framework or stance, either in terms of the inflation target or the repo rate specified by the MPC.

2. A brief history of monetary policy implementation in South Africa

Over time, South Africa has used a variety of frameworks for implementing monetary policy, with three distinct operating regimes identifiable for the period since 1960.[7] Under the first, in force from the 1960s into the early 1980s, the SARB used quantitative controls on interest rates and credit, buttressed by liquid asset requirements for banks' short-, medium- and long-term liabilities.[8]

In line with the De Kock reports of 1978 and 1985, the SARB then shifted from direct controls on the monetary system to a second more market-based regime, with a simpler cash requirement. Banks' liquidity demands were funded on demand, against

[6] The proposed framework features some complexity beyond that found in pure floor systems, mainly given its use of tiers or quotas, but it remains simpler than corridor-style alternatives.
[7] Janine Aron and John Muellbauer, 'Review of monetary policy in South Africa since 1994', *CSAE Working Paper 2006-07,* 2006, pp 2−3 and table 2. https://www.csae.ox.ac.uk/materials/papers/2006-07text.pdf

[8] At the time, complex monetary policy frameworks were common practice. For this reason, Ulrich Bindseil has described the period from about 1960 to 1990 as 'the baroque age' of monetary operations, with a preference for parsimony returning during the 1980s. See Ulrich Bindseil, 'Evaluating monetary policy operational frameworks', 2016, available at https://www.kansascityfed.org/documents/7036/BindseilPaper_JH2016.pdf

eligible collateral, at the Bank rate[9], and the SARB also aimed to signal its preferences to the market by varying the size of the money market shortage.[10] Because the Bank rate represented a lending facility, this was essentially a ceiling system, as banks could always borrow at this rate and so had no incentive to pay more for cash in the interbank market.[11]

Under the second system, interbank interest rates proved to be relatively unresponsive to changes in the size of the shortage and tended to follow the Bank rate instead. Given this experience, from 1998 the SARB moved to a third system, where the price of central bank money took clear precedence over the quantities provided. Banks continued to face a money market shortage, but the size of that shortage was no longer intended to convey the policy stance. Instead, the SARB's aims were signalled solely through the interest rate banks paid to borrow at the SARB, renamed the repo rate.[12]

In this third system, banks' funding requests were no longer satisfied automatically and in full at a fixed rate. Instead, the new repo system began with daily auctions at floating rates, with banks now expected to manage their own liquidity needs more actively and to adjust their bid rates accordingly. This system lasted until 2001, except for a period between November 1999 and January 2000 where fixed-rate auctions were conducted as insurance against possible Y2K volatility. This fixed-rate format was then made permanent in 2001, to remove any ambiguity about the SARB's monetary policy stance.

Since 1998, the SARB has routinely tweaked its money market operations. In 2001, standing facilities were added at a spread of 150 basis points on either side of the repo rate, and this spread has been adjusted on four occasions since then.[13] The list of

[9] The term repo rate was not adopted until 1998

[10] On the SARB's practice of adjusting both the size of the shortage and the Bank rate, see Chris Stals, 'Address by the Governor of the South African Reserve Bank on 15 May 1997, p 4. *BIS Review No. 54,* available at https://www.bis.org/review/r970602b.pdf

[11] Ernie van de Merwe, 'Monetary policy operating procedures in South Africa', *BIS Policy Papers No. 5*, March 1999, pp 235−236. https://www.bis.org/publ/plcy05l.pdf

[12] SARB, 'Discussion paper on monetary policy operational procedures', December 1997.

[13]The standing lending facility was narrowed to 50 basis points on either side of the repo rate in 2005, then widened again to repo plus or minus 100 basis points in 2010. In March 2020 the standing lending facility was

eligible collateral for repo auctions was expanded in 2007 to remedy a shortage of collateral at the time, owing to reduced government debt issuance, but then narrowed again from 2011 given limited utilisation of the additional collateral and expanded issuance of sovereign debt.[14]

SARB communications about the size of the money market shortage also varied, with the SARB first announcing the estimated shortage, then from 2001 withholding this information, then from 2005 announcing the range of the market-wide shortage for the preceding week (but with no detail for individual banks), and from 2010 announcing the average daily shortage for the week preceding the auction as well as the shortage for the day preceding the auction.

In 2012 the SARB began prorating allocations where repo auctions were oversubscribed, replacing a system where banks could each bid for and win the full announced shortage, which had the potential to produce an end-of-day money market surplus.[15] Until the onset of the COVID-19 crisis, the SARB would offer an amount equivalent to the shortage, and then prorate bids up to that announced quantity. During the initial COVID-19 shock, the SARB expanded its auction offerings. When these special measures were concluded, the announced shortage reverted to a R56 billion shortage, in line with pre-crisis auctions, even though the liquidity requirement has generally been smaller.

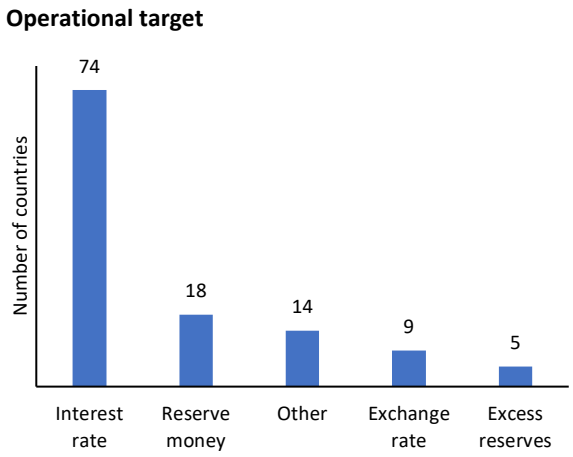
Overall, this brief history of monetary policy implementation in South Africa shows a long-term shift towards a simpler and more market-based framework, in line with global trends. The emphasis on a money market shortage to transmit interest rate

reduced to the repo and the deposit facility was lowered to repo minus 200 basis points; in August 2020 the pre-existing symmetrical 100 basis point spread was restored.

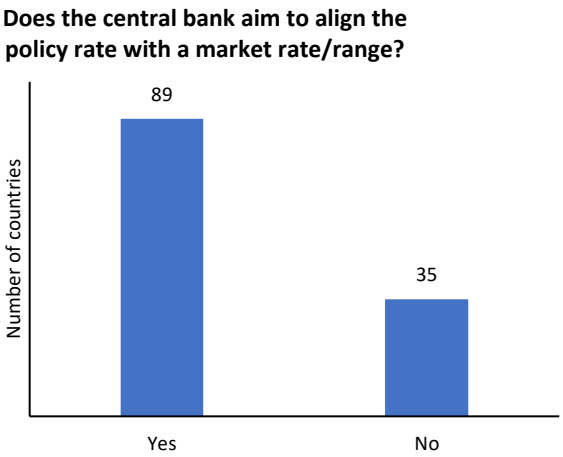
[14] SARB, 'An implementation paper on the modifications to the money market operations of the South African Reserve Bank', May 2005. https://www.resbank.co.za/content/dam/sarb/publications/modifications-to-mm-operations/2005/3739/Modifications_MM_Operations.pdf; SARB, 'South African Reserve Bank's monetary policy operational procedures', August 2010. https://www.resbank.co.za/en/home/publications/publication-detail-pages/media-releases/2010/3732

[15] SARB, 'An implementation paper on the changes to the monetary policy operational procedures of the South African Reserve Bank', January 2012. https://www.resbank.co.za/content/dam/sarb/publications/modifications-to-mm-operations/2012/4938/ImplementationPaper2012.pdf

decisions is nonetheless unusual, from a global perspective.[16] Replacing the shortage system would take the SARB still closer to the global frontier of central bank operations.



Source: IMF MOID. South Africa classified as 'other'



Source: IMF MOID. SA classified as 'no'

3. The shortage system and its shortcomings

3.1. Changes in the size of the shortage

A classical shortage system implements monetary policy by making the central bank the marginal supplier of liquidity to the banking system.[17] Specifically, having a shortage means that banks are unable to source, in the market, all the reserves they need to meet reserve requirements. The central bank must therefore provide these funds, which it can do at a price of its choosing. In South Africa, because the SARB has filled the shortage through secured loans, the system has also obliged commercial banks to hold eligible collateral to access the repo auctions.

Although this system has a clear logic, it has always been difficult to specify how large the shortage should be to transmit monetary policy effectively. In the South African

[16] At the time of writing, no other jurisdiction could be identified where a classical shortage system is used. The data shown here are drawn from the Monetary Operations and Instruments Database maintained by the Monetary and Capital Markets Department of the IMF, reproduced with permission.

[17] For a discussion of this 'classical' system, see Paul Tucker, 'Managing the central bank's balance sheet: where monetary policy meets financial stability', 2004, pp 21−22, available at https://www.bankofengland.co.uk/-/media/boe/files/speech/2004/managing-the-central-banks-balance-sheet.pdf. Note that this system was different to the SARB's shortage system, with no announcement of the size of the shortage, no routine refinancing auctions, and with a penalty rate charged on refinancing operations. Tucker describes this system as 'half a corridor', with the Bank of England's lending window resembling the SARB's standing lending facility more than its weekly repo auctions.

case, when the system was introduced, the shortage oscillated at around 100% of required reserves. It has changed significantly over time, however, trending somewhat higher between 1998 and 2002 but then staying roughly flat until 2013. During this time, it shrank dramatically relative to variables such as the broad money supply, or total bank lending, which grew strongly. In response, in 2013 the SARB chose to let the shortage increase again, allowing it to expand by around 250% over a period of approximately three years through growth in the autonomous factors (mostly notes and coin).[18] Thereafter, additional growth in this SARB liability was redirected into funding foreign exchange reserve accumulation, in response to specific inflows of foreign direct investment, leaving the shortage stable at around R56 billion.

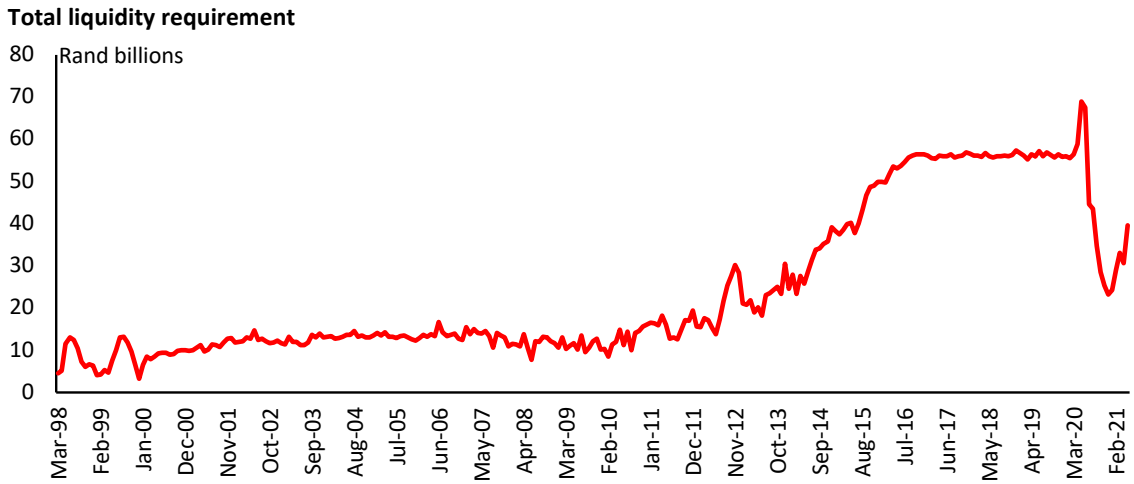
The COVID-19 shock was unprecedented in modern South African financial history, both in terms of the strains it placed on the system and the policy innovations it demanded. Banks reacted to the initial shock by hoarding liquidity, where possible, which created a new equilibrium for the interbank market in which funds were no longer redistributed effectively. The SARB responded by providing additional liquidity, which was appropriate on financial stability grounds but had the side-effect of reducing the shortage below its targeted level.

Although this emergency demand for liquidity subsided within a few months, the shortage did not recover to pre-crisis levels. Instead, the SARB subsequently tolerated a persistently smaller shortage, to avoid draining large quantities of reserves and to accommodate new injections of liquidity, from factors including the bond purchase programme, National Treasury's partial draw down of its Sterilisation Deposit Account (NTSDA[19]), and funding of the Loan Guarantee Scheme. Since the start of 2021, the shortage has averaged about R30 billion, close to half its pre-COVID level. Relative to a range of metrics – broad money supply (M3), banks' liabilities, banknotes and coin in circulation, and minimum cash reserve requirements – the size of the shortage is

[18] This shift also improved the SARB's profitability, by channeling more of its liabilities (notes and coin) into funding more profitable assets (accommodation to banks, not foreign exchange reserves).
[19] The NTSDA contains government funds which were originally placed at the SARB to assist with foreign exchange reserve purchases. These are sterilisation deposits in the sense that the SARB bought foreign exchange in return for rands, and National Treasury then helped absorb these rands by placing funds at the SARB, out of circulation. These deposits were mainly accumulated before the 2009 crisis. See National Treasury, *Budget Review,* 2007, pp. 91−92.
http://www.treasury.gov.za/documents/national%20budget/2007/review/chap5.pdf

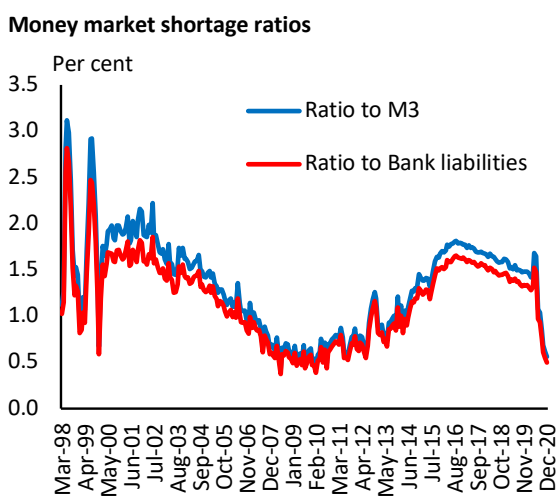
now smaller than it was in 2013, when the SARB resolved to expand it. Indeed, by these measures, the shortage has only been smaller during 2009 and 2010.[20]

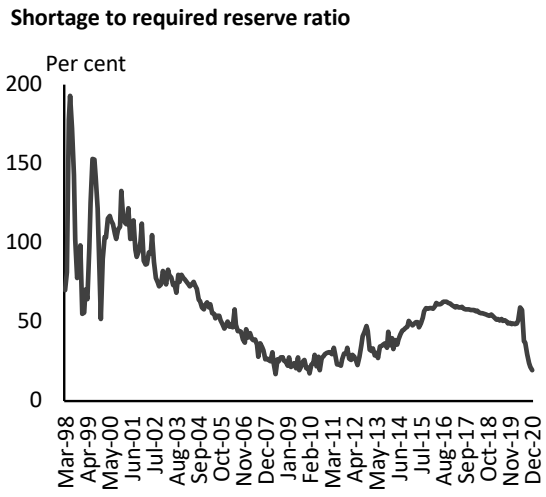
It should also be noted that the overnight position, which includes SARB funds provided to make up the shortage and any supplementary interventions, has generally been in surplus.[21] This contrasts with the pre-crisis position where it was typically very close to zero, consistent with a system designed to square off precisely with no banks either long or short. Specifically, the overnight position has averaged R6.18 *billion* for the period between March 2020 and mid-2021, against R1.3 *million* for 2019. The shortage system has therefore not only suffered from an unusually small liquidity requirement, but also an unusually large excess liquidity supply on an overnight basis.



[20] Had the shortage been sustained at the levels where it first stabilised in 2000, it would now be R75.2 billion (relative to M3). Using 2016 as the starting point, achieving the same ratio to M3 would imply a shortage of R74.9 billion. Were the shortage once again equal to 100% of required cash reserves, it would now be around R120 billion. The gaps between these metrics and the prevailing reality are substantial.

[21] The overnight position reflects total liquidity, including repo and supplementary repo lending, less cash in cash reserve accounts and also less all liquidity draining operations, including supplementary reverse repos.





3.2 Observed pricing of bank reserves

In principle, in a shortage system an oversupply of liquidity should drive interbank rates below the policy rate, as banks seek to avoid placing funds in the standing deposit facility at a punitive rate (the 'hot potato' effect). Consistent with this theory, the observed prices of bank reserves has deviated from the official repo rate by larger margins than they did before the onset of the COVID-19 pandemic.

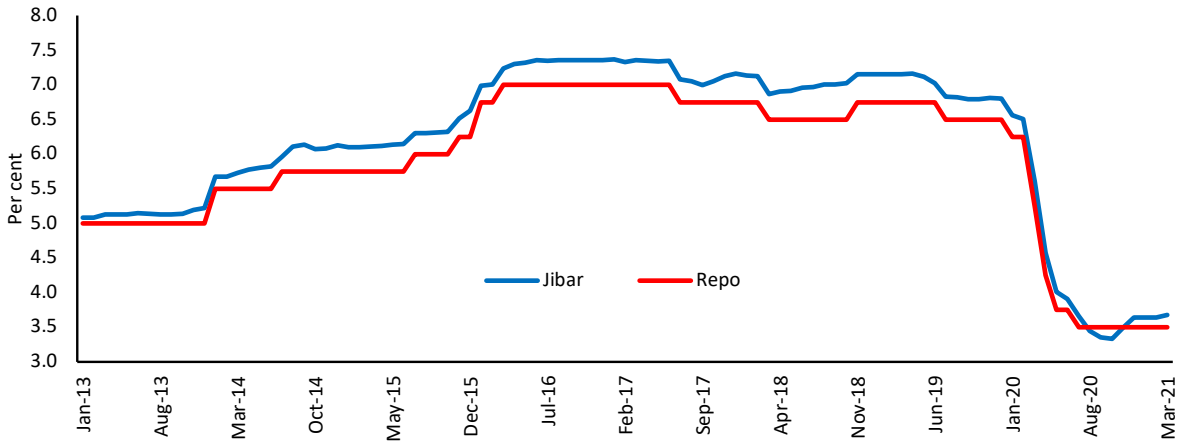
The most important benchmark for interbank funds currently is the Johannesburg Interbank Average Rate (Jibar). These data show that interbank rates have traded at an unusually small margin to repo, since March 2020, with an average spread of 11.7 basis points up to mid-2021, compared with 34.4 basis points during 2019. Jibar even dipped below repo for a period in mid-2020, a phenomenon not observed since the global financial crisis, when expectations of rate cuts pushed the 3-month Jibar below repo. This may represent the first time that the SARB's liquidity management operations have contributed towards Jibar falling below repo since that rate's inception.

The South African Benchmark Overnight Rate (Sabor) differs from Jibar in that it has remained closely aligned to the repo rate. The interbank rates in this benchmark have nonetheless frequently traded below repo, consistent with the Jibar data. At the same time, the small (5%) foreign exchange (FX)-implied component in Sabor has been above the repo rate (and volatile) – a problem discussed further in section 3.3, below.[22]

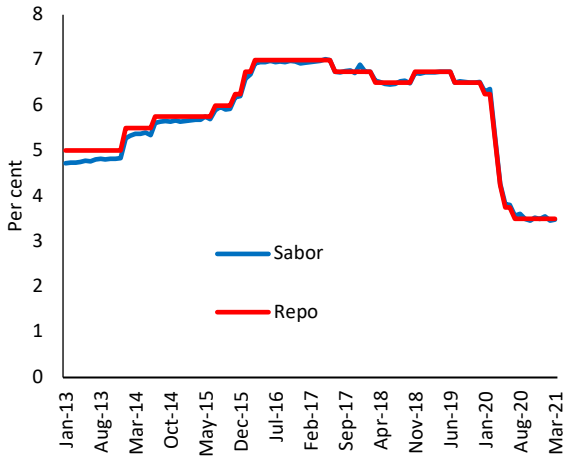
[22] It should also be noted that these benchmark rates omit some transactions.

The components of Sabor therefore indicate imperfections in monetary policy transmission, even though these are less visible at the headline level.

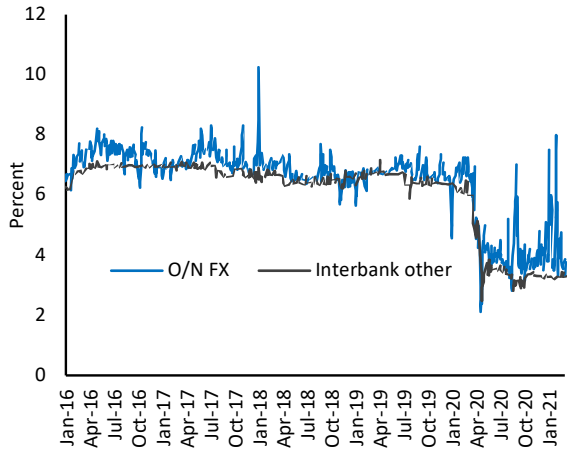
Three-month Jibar versus the repo rate



Sabor versus the repo rate



Selected Sabor components



The SARB has also been working on reference rate reform, testing new benchmark rates with a view to replacing Jibar and other existing benchmarks. Test data for the reformed rates show similar results to those described above, with the spreads over repo for both ZARIBOR and ZARONIA narrowing since the onset of the COVID-19 shock.[23]

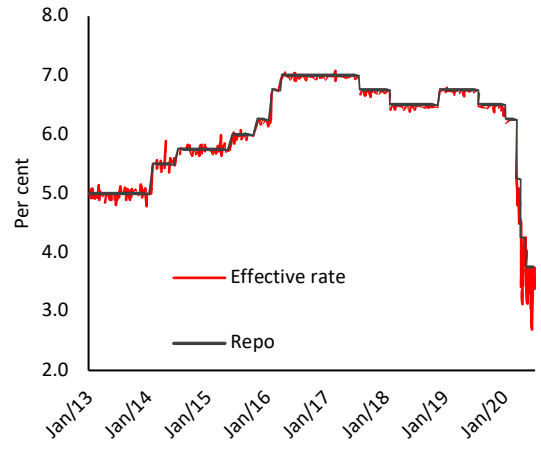
A further consideration is that banks have resorted to the standing facilities for substantially larger amounts than they did pre-COVID, despite punitive pricing. For this reason, the weighted cost of central bank funding – which reflects prices for

[23] South African Reserve Bank, 'Feedback on the statement of methodology and policies governing the SARB-administered interest rate benchmarks', 2021, forthcoming.

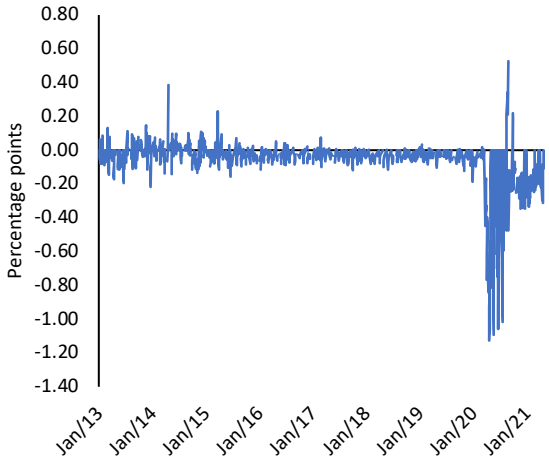
reserves in transactions with the SARB rather than in markets – has averaged 21.1 basis points less than the repo for the period from March 2020 to mid-2021, compared with an average of 3.5 basis points below repo for 2019.[24]

In the initial stages of the crisis, this greater reliance on the standing facilities reflected a loss of trust in the interbank market. Relatively heavy use of the standing facilities has nonetheless persisted well past that stage of the crisis, likely reflecting regulatory and operational factors which have caused banks to rely less on the interbank market for sourcing or placing reserves. The existing framework is meant to provide daily access for banks to reserves through the interbank market, with the system squaring off overnight, but the reality has departed from this ideal.

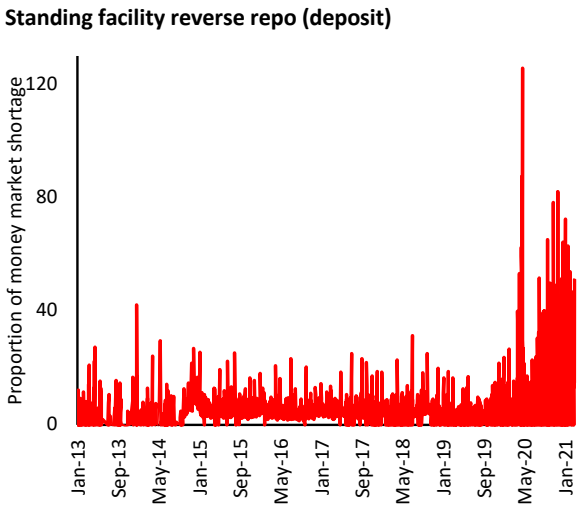
Repo and effective repo rates

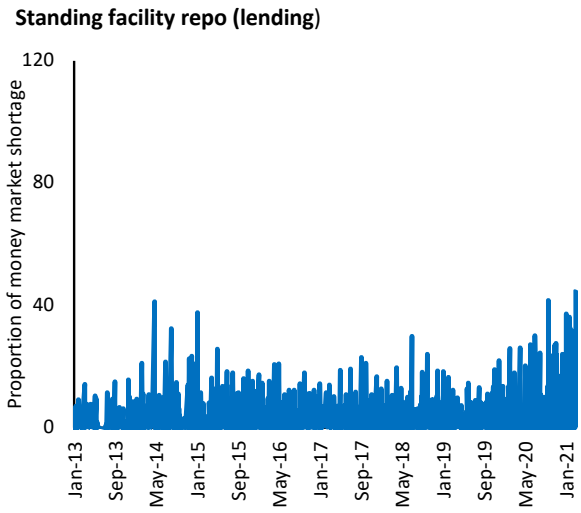


Deviation of effective repo from repo



[24]This calculation reflects the weighted average cost of central bank money, based on the method described in Mukelani Nkuna, Daan Steenkamp and Rossouw van Jaarsveld, 'The market reaction to monetary policy changes and liquidity interventions', *Discussion Paper 20/01,* June 2020. The weighted average cost includes funds borrowed at repo, at the standing lending facility, the standing borrowing facility, and though term repos. These authors argued "…[that the] effective repo is a more appropriate measure of the current stance of monetary policy, and as such, it has a lower mean, greater volatility and is less affected by measurement error, which we argue imply that these estimates paint a more reliable picture of the actual pass-through of policy since the Covid-19 crisis."





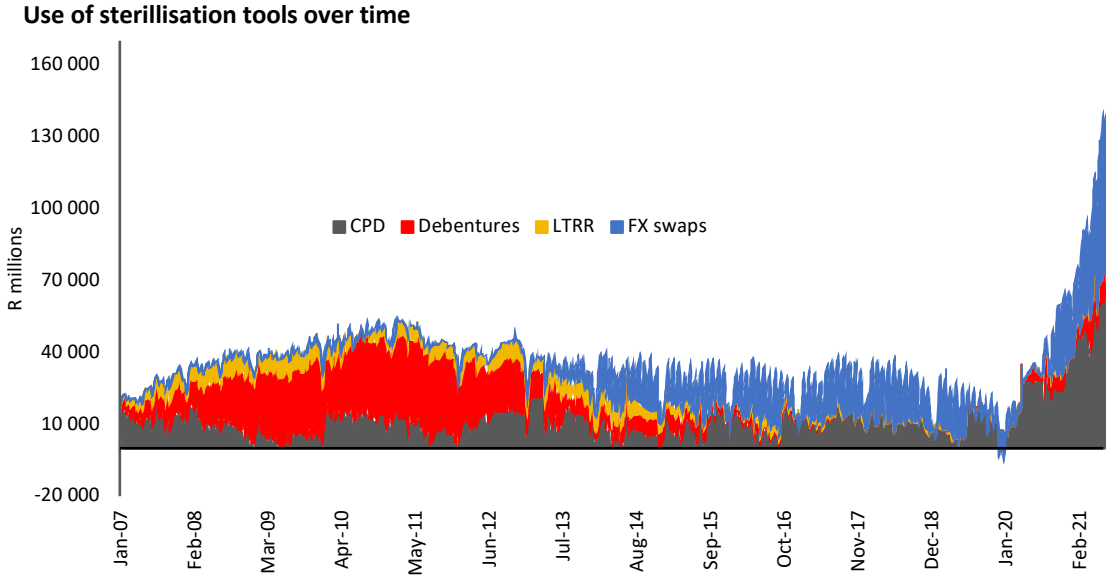
Overall, a reasonable summary is that the observed price of bank reserves has not followed the official repo rate as consistently as it did pre-COVID-19. This reflects changes in the behaviour of interbank rates as well as greater reliance on the SARB standing facilities. While these shifts have not amounted to a serious breakdown in monetary policy implementation, they have demonstrated weakness in the framework. These concerns could justify reform to improve monetary policy transmission.

3.3 The policy implementation toolkit

A more urgent concern is the capacity of the existing toolkit to *maintain* transmission. The shortage is already unusually small and there are plausible scenarios in which new liquidity shocks could reduce it further, or potentially eliminate it altogether, for instance if National Treasury further reduced its NTSDA balances.[25] New liquidity shocks would not be problematic if the additional bank reserves could be sterilised through SARB interventions. The limitations of the current toolkit, however, suggest that the SARB would not be able to drain liquidity at will – the same reason the shortage has been comparatively small recently. The toolkit also has disadvantages in terms of its costs and distortionary side effects.

[25] There was also a withdrawal from this account of R26 billion in 2020. Further withdrawals are contemplated in National Treasury's Medium Term Budget Policy Statement, November 2021, p 34. http://www.treasury.gov.za/documents/mtbps/2021/mtbps/FullMTBPS.pdf

At present, the SARB has five tools it can use to manage liquidity: (i) FX swaps, (ii) SARB debentures, (iii) long-term reverse repos (LTRR), (iv) public sector deposits (mainly from the Corporation for Public Deposits (CPD)), and the monetary policy portfolio of South African government bonds.[26] The following sections that follow detail the properties and shortcomings of each tool.



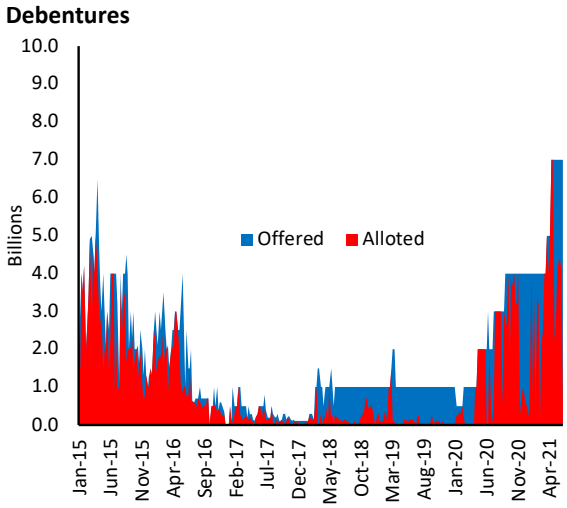
- The SARB's ***debentures*** are prone to a low uptake. Offering debentures at rates higher than the repo rate has improved demand marginally, but relying on higher yields to secure demand for debentures creates the risk of an arbitrage trade in which the SARB borrows above its own lending rate.[27] This is especially problematic if debenture margins are set too high on short tenors. Higher-yield, longer-term debentures might also compete with Treasury bills in some respects.

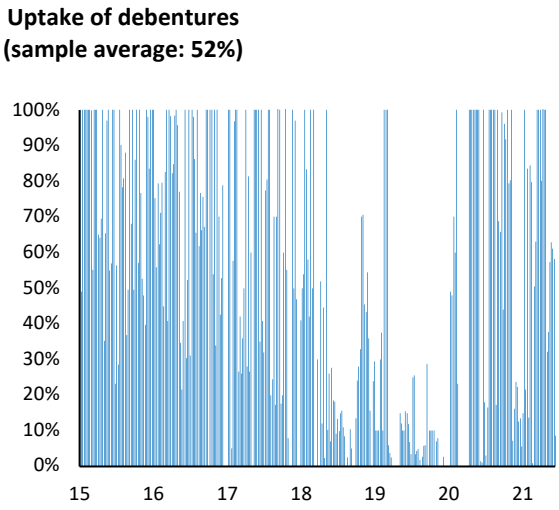
  Debentures are also not as readily accepted as government instruments in private sector repo activities, meaning it is more difficult for banks to use them to access cash. (Debentures are acceptable collateral for SARB repo operations, provided they have a tenor greater than seven days.) Furthermore, debentures, unlike

[26] The toolbox also features buy/sell-backs, but this instrument has not been used. Unlike repos, in a buy/sell-back the two legs are treated as separate transactions. The cash reserve requirement is not used as a liquidity management tool. In the past, National Treasury assisted with sterilisation needs related to foreign exchange reserve accumulation by making deposits at the SARB, but National Treasury has subsequently drawn down this facility. The bond portfolio has not been used for liquidity management purposes, but it is available if needed.
[27] Note that this is a distinct problem to setting the policy rate.

Treasury bills, withdraw liquidity from the banking system, which again reduces their relative attractiveness. These factors explain why the SARB has also not been able to rely on debentures to consistently absorb large amounts of cash.

Outstanding debentures have averaged R9.7 billion over the past 23 years, with a peak of R34.6 billion in 2011 and an average of just R3.3 billion during the first half of 2021. Debenture auctions have been under-subscribed even where banks have later had recourse to the standing deposit facility, suggesting the price incentives alone have been insufficient to make debentures effective.



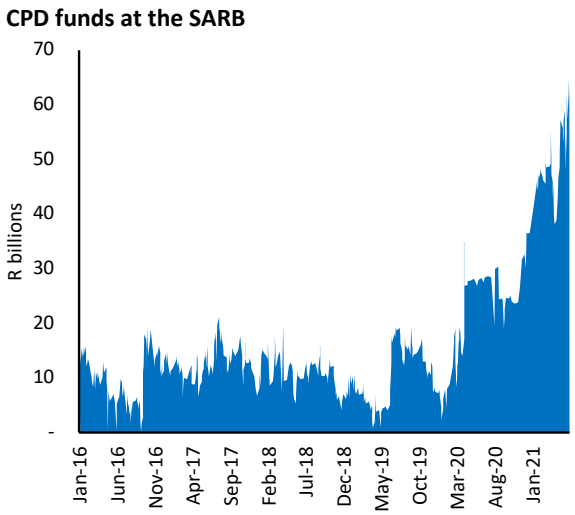


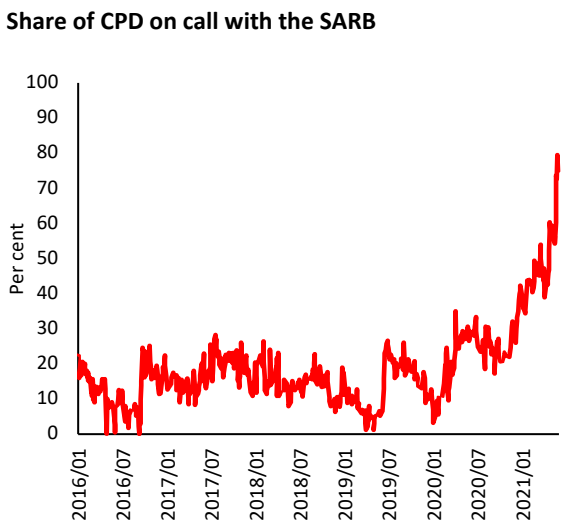
- ***Long-term reverse repos***[28] have a significantly lower uptake than debentures, making them almost irrelevant as a tool for open market operations. Average volumes since the start of 2018 have been just R59 million, with a modal value of zero for this sample period. LTRRs have not been competitive with Treasury bills, and although the SARB has continued to offer them weekly, a long period of minimal use has likely caused this facility to be overlooked by banks.

- ***Public sector deposits, through the CPD***, have been a crucial tool for absorbing liquidity over the past year, with the SARB holding CPD funds in a SARB call account rather than placing them in the market. However, there is little scope to expand the

[28] In a reverse repo, the SARB lends out an asset such as a government bond and receives cash in exchange. At the conclusion of the agreement, the two parties unwind the transaction. When a central bank conducts a reverse repo, this temporarily reduces the supply of liquidity in the market.

use of this tool further, given the overall funds available. This is also a relatively expensive sterilisation tool for the SARB.

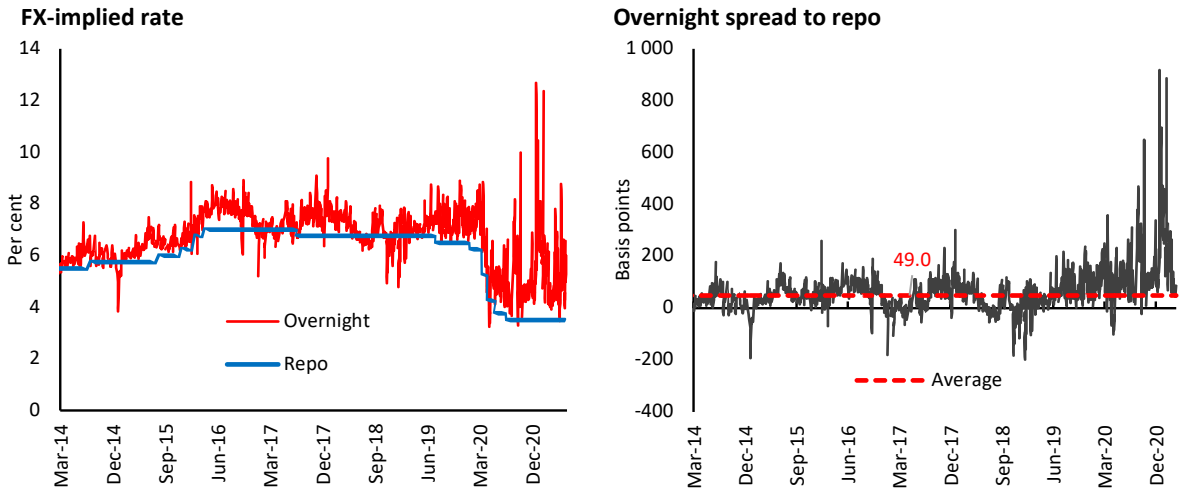




- ***FX swaps*** have been the SARB's primary tool for implementing the shortage for much of the period since 2014.[29] In 2020, reliance on FX swaps to sterilise inflows from international financial institutions contributed to large distortions in the forward market. With FX-implied rates high and volatile, it has been more difficult for non-residents to access rands for buying longer-term assets, such as government bonds. This effect may have weakened monetary policy transmissions to the longer-end of the yield curve. The unusual behaviour of these rates may also have created some unwarranted confusion about the monetary policy stance.[30] These concerns have limited the further use of FX swaps for liquidity management purposes, with the SARB unable to mature sizeable amounts of these swaps and relieve forward-market pressures, given the need to maintain a reasonable money market shortage.

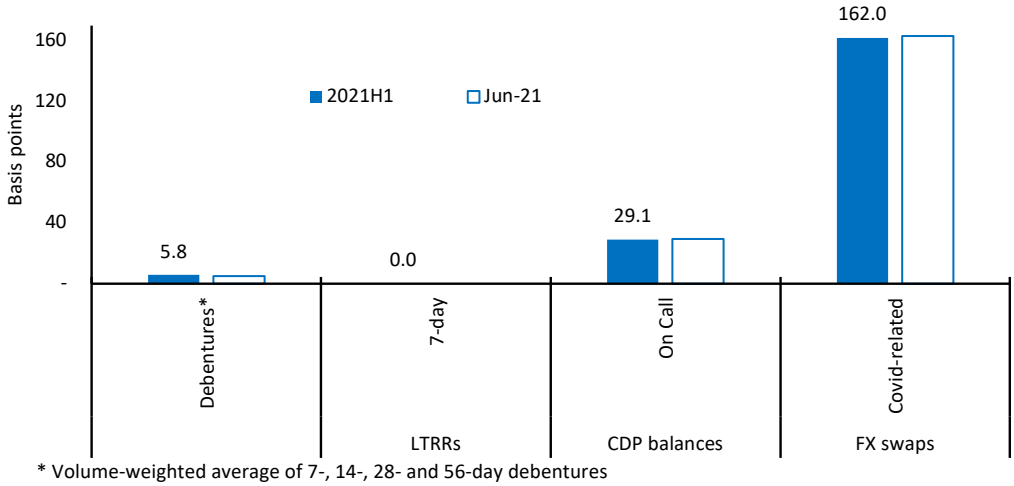
[29] An FX swap involves the exchange of an amount of one currency for another, with an agreement to swap the currencies back at a given future time. The amounts specified in the first and second legs of the swap typically vary, meaning different exchange rates are used for the two legs. This difference implies an interest rate (the FX-implied rate).

[30] For a fuller discussion, see South African Reserve Bank, 'Box 5: The problem of high foreign exchange-implied interest rates' *Monetary Policy Review,* April 2021, p 22.
https://www.resbank.co.za/content/dam/sarb/publications/monetary-policy-review/2021/MPRApr21Internet.pdf



- The SARB's ***monetary policy portfolio*** contains bonds worth about R40 billion. This portfolio can be expanded (through purchasing bonds, which would inject liquidity) or contracted (by selling bonds to withdraw liquidity permanently). Its usefulness for sterilising liquidity is limited, however, by the size of the portfolio. Bond sales may also disrupt the local currency government bond market in some circumstances (the reverse effect to the stabilising influence bond purchases had during 2020), since they impact not just reserve balances, but also the term yield curve.[31]

Cost of sterilisation instruments



* Volume-weighted average of 7-, 14-, 28- and 56-day debentures

[31]Central banks, including the SARB, typically hold portfolios of government bonds for liquidity-management purposes. The assets in this portfolio were largely accumulated during 2020, however, which helps explain why this tool was not used previously. The bonds previously available were mainly used for LTRRs.

In addition to these shortcomings, the existing toolkit is relatively expensive. In general CPD call deposits are reimbursed at around 30 basis points above repo, while FX swaps have been transacted at rates in excess of 150bps over repo, depending on the tenor. While profit considerations are of secondary importance for the SARB, it remains preferable to use more cost-effective tools where these are of comparable or greater quality. By contrast, were the SARB to adopt a floor system, the interest rate floor would become the key tool for draining liquidity, which would reduce sterilisation costs to the repo. As for a mid-corridor system, this would provide no new tools for draining liquidity.

In sum, while the interest rate analysis above makes the point that there have been partial deviations of market rates from the repo, the analysis in this section shows that the framework is not robust to shocks, with limits in terms of its effectiveness, its tendency to cause distortions and its costliness. It is conceivable that the existing framework could prove incapable of delivering any size shortage as soon as 2022, which would undermine the effectiveness of a shortage-based system of monetary policy implementation.

4. Options for framework reform

4.1 Mid-corridor and floor systems

The SARB has studied options for reforming the MPIF for several years. Earlier work focused on developing a corridor system with a market-rate target[32], in line with global best practice before the global financial crisis of 2008−09.[33] However, as excess reserves have become the norm for many interbank markets, there has been a large-scale shift among major central banks away from midpoint corridors and towards floor systems.[34] Examples include the Bank of Japan, the United States (US) Federal Reserve, the European Central Bank and the Bank of England. These experiences

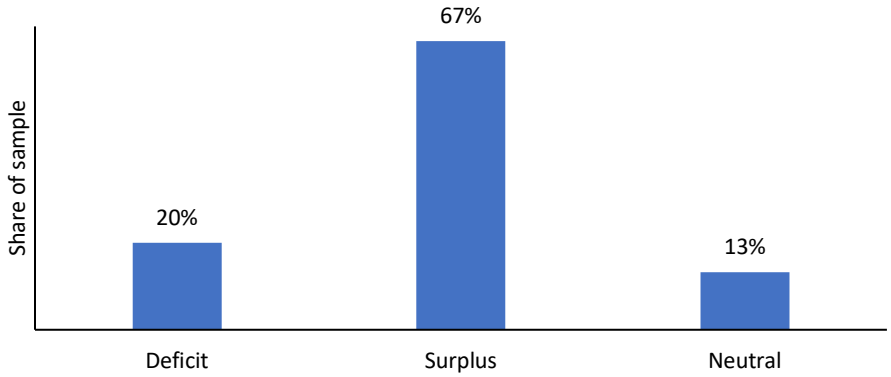
[32] With a market-rate target, the central bank specifies a benchmark rate (such as Sabor or Jibar) and then intervenes in the relevant market to keep that rate as close to the official policy rate as possible.

[33] A helpful primer on the differences between the two systems is Todd Keister, 'Corridors and floors in monetary policy', 4 April 2012, available at https://libertystreeteconomics.newyorkfed.org/2012/04/corridors-and-floors-in-monetary-policy.html

[34] Adam Cap, Mathias Drehmann and Andreas Schrimpf, 'Changes in monetary policy operating procedures over the last decade: insights from a new database', *BIS Quarterly Review,* December 2020. https://www.bis.org/publ/qtrpdf/r_qt2012c.htm

have shown advantages to floor systems that have made them robust alternatives to mid-corridor systems, splitting the pre-2009 consensus.

Structural liquidity position



Source: BIS. A 'structural liquidity surplus' means that the banking system in aggregate, and *absent* offsetting central bank operations, has more bank reserves than strictly needed for reserve requirement and/or settlement purposes.

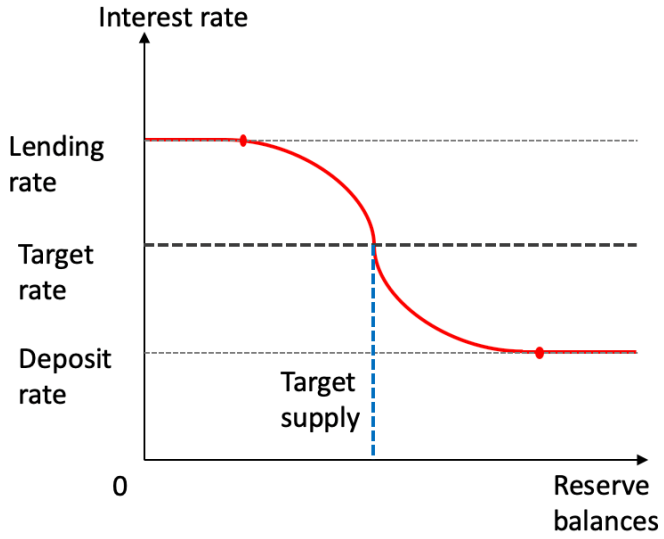
4.1.1 Mid-corridor systems

The defining feature of mid-corridor systems is that bank reserves are scarce. To prevent large spikes in the price of reserves, central banks offer standing facilities where banks can either deposit surpluses or borrow to make up shortages, but as banks are meant to rely on the market for funds, these facilities are priced at punitive rates (for instance, plus or minus 100 basis points above or below the policy rate). For a central bank operating a mid-corridor system, the objective is to ensure that the market price for reserves is typically close to the middle of the corridor (hence 'mid-corridor'). This is achieved by some combination of open market operations to fine-tune the supply of reserves in the system, and by providing facilities that lend or borrow at the policy rate on given occasions (such as weekly liquidity auctions).

In mid-corridor systems, if the central bank does not control liquidity appropriately, at least some banks will be forced into one of the standing facilities at the end of the day − either the deposit facility in the case of a surplus or the lending facility in the case of a shortage. This prospect creates an incentive for banks to trade reserves at rates other than the policy rate to avoid the standing facility penalties, which causes market rates to diverge from the central bank's target. For this reason, banks using mid-corridor systems require both accurate liquidity forecasts and a toolkit capable of remedying shortfalls or surpluses of liquidity. If the market were undersupplied with reserves, the central bank would have to address that through lending operations or

asset purchases (where the central bank pays in new reserve money, expanding its supply). By contrast, if the market were oversupplied, the central bank would need to have a liquidity draining toolkit capable of removing sufficient funds to balance the market.

Stylised representation of a midpoint corridor system



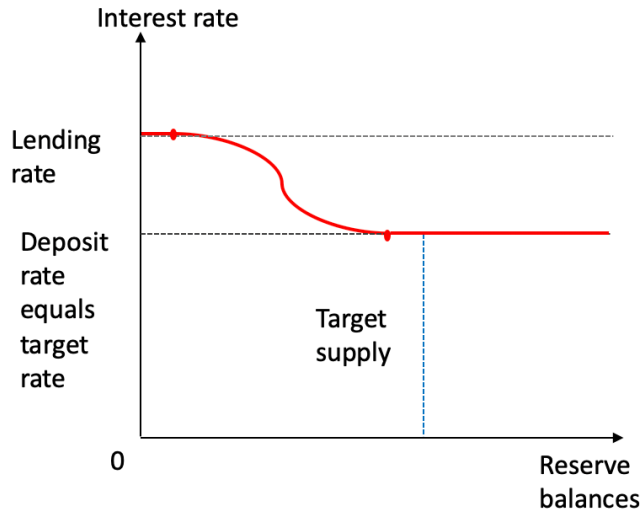
4.1.2 Floor systems

By contrast, the essence of a floor system is that bank reserves are abundant. While individual banks can use their reserves to acquire other assets, the system in aggregate cannot reduce its demand for bank reserves: at the end of the day, the existing reserve supply will be distributed among banks, one way or another.[35] For this reason, an excess supply of reserves means that one or more banks will be forced into the deposit facility, which is the bottom of the corridor described above, at the end of each day. This is not punitive for banks, however, as the deposit rate is set equal to the policy rate. Banks are incentivised simply deposit funds at the central bank, which is the safest borrower of the local currency and therefore a more attractive recipient of surplus funds than any other institution. Furthermore, other banks would also have an incentive to take any funds offered below the policy rate, simply to place them with the central bank. Together, these forces absorb downward pressure on interbank rates, preventing them from falling below the policy rate. The remaining requirement for the

[35] In contrast with instruments such as debentures, there are no options for banks to avoid taking reserves the central bank places in the system through open market operations.

central bank is then to ensure the market is saturated with reserves, so rates also do not rise above the floor. Together, this combination, of reserve abundance and interest on reserves, produces a high level of interest rate control.[36]

Stylised representation of a floor system



There is no overriding consensus on whether floors or corridors are superior, and the choice for any given central bank is therefore likely to reflect country-specific circumstances. The following sections detail the relevant considerations. The first five points (excess liquidity, balance sheet policies, financial stability, regulation, and complexity) favour a floor system. However, the analysis of the mid-corridor alternative demonstrates pitfalls to pure floors, at least in the South African context, in terms of interbank market activity and SARB balance sheet growth. These pitfalls suggest a tiered-floor framework would be superior to a pure floor, given local conditions.

[36] On the 'decoupling principle', where interest on reserves ensures that the price of reserves is separated from the quantity of reserves, see Claudio Borio and Piti Disyatat 'Unconventional monetary policies: an appraisal', *BIS Working Papers No. 292*, November 2009. https://www.bis.org/publ/work292.pdf. For a simple explanation of how monetary policy transmission worked in the United States pre-2009, with scarce reserves, and how it functions now, with ample reserves, see Jane E Ihrig and Scott A Wolla, 'How does the Fed influence interest rates using its new tools?', 5 August 2020. https://www.stlouisfed.org/open-vault/2020/august/how-does-fed-influence-interest-rates-using-new-tools

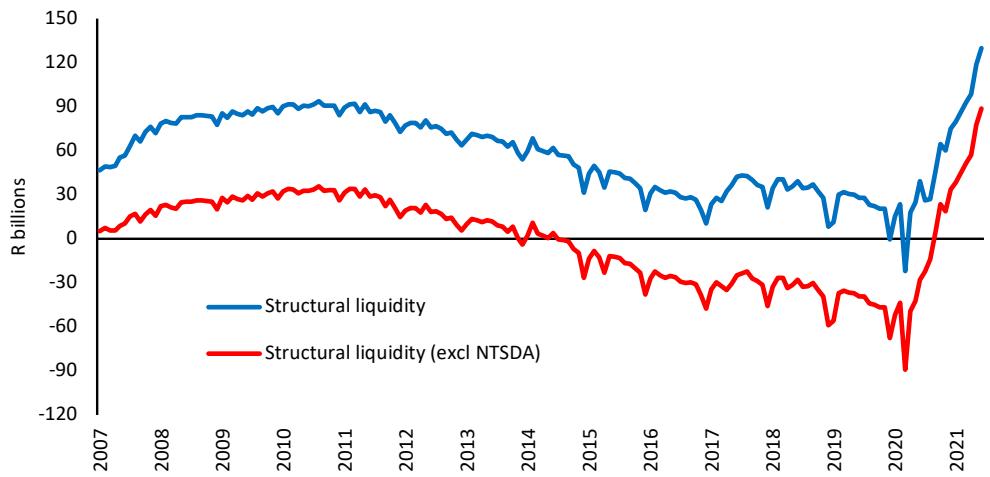
4.2 Advantages of floor frameworks

4.2.1 Structural liquidity and interest rate control

The primary consideration in choosing between a floor and corridor framework is typically the structural liquidity position, defined as the underlying supply of bank reserves in the absence of central bank interventions to manage liquidity. Floor systems require ample reserves, and interest rates will rise above the policy target where supply does not substantially exceed demand. By contrast, corridor systems require reserve scarcity, and where it is difficult to achieve this scarcity – if the structural position is a surplus, and if the toolkit for draining liquidity is ineffective – then corridor systems will not function efficiently.

As narrated above, South Africa has experienced a large increase in structural liquidity since the onset of the COVID-19 pandemic. Given the limits of the sterilisation toolkit, this phenomenon has created the problems for the framework described in section 3 (costs, distortions and imperfect transmission of the repo to short-term rates). This surplus position is also not exclusively a recent phenomenon, with historical estimates of structural liquidity showing consistent surpluses back to 2007[37], primarily due to foreign exchange reserve accumulation, some of which was sterilized through government deposits at the SARB into the NTSDA account, which have subsequently been drawn down. South Africa's tendency to a structural surplus, rather than a structural deficit, in an important argument in favour of a floor-style system.

Structural liquidity



[37] Data limitations meant this chart could not be extended earlier than 2007

4.2.2 Balance sheet policies

This points to a second consideration, which is the flexibility that floor systems confer to conduct balance sheet operations. The most straightforward solution for engineering reserve scarcity is to have minimal central bank balance sheet operations and rely on growth in the autonomous factors to drain reserves from banks. If the central bank acquires fewer assets, there will be less liquidity to manage.[38] By contrast, if a central bank buys assets, this will expand structural liquidity. A corridor system will therefore be preferable where a central bank typically avoids balance sheet operations, and vice versa in the case of a floor.

While many advanced economy central banks have switched to floors in the context of QE, it is important to appreciate that balance sheet operations also include transactions such as foreign exchange reserve accumulation and funding-for-lending schemes. In the South African case, reserve accumulation has been the most important balance sheet policy over the inflation-targeting period, and it is this objective that prevented the SARB from maintaining a consistently large money market shortage. The shortage framework has also constrained additional foreign exchange reserve purchases, with the tension between balance sheet operations and monetary policy implementation under the shortage system forcing compromises in both directions. The SARB has also conducted other kinds of balance sheet policies, with its 2020 interventions including funding for government's Loan Guarantee Scheme as well as bond purchases to stabilise a key financial market. (The SARB also acquired significant quantities of foreign exchange in 2020, related to the proceeds of loans from international financial institutions.) These experiences suggest South Africa would benefit from having a framework better suited to conducting balance sheet operations, when required.

4.2.3 Financial stability implications

A larger central bank balance sheet entails more asset holdings, but also a larger supply of central bank liabilities in the form of bank reserves. These are extremely safe

[38] Todd Keister, Antoine Martin and James McAndrews, 'Divorcing money from monetary policy', September 2008. https://www.newyorkfed.org/medialibrary/media/research/epr/08v14n2/0809keis.pdf. This paper is also the basis for the stylised representations of the floor and midpoint corridor systems shown above, although such charts also appear in many other papers.

and liquid assets for banks, which raises the third consideration: financial stability.[39] Floor systems permit an abundant supply of bank reserves, with interest rate control (and therefore inflation control) achieved though interest on reserves. This permits an operationalisation of the Friedman rule, which holds that if an item of value can be produced costlessly, its supply should not be rationed.[40] Given these financial stability considerations, major central banks are likely to maintain floor systems in future, instead of returning to the small balance sheets and corridor frameworks of the pre-2009 period.[41] This is likely to be the case even if balance sheet policies such as QE were no longer needed.

In South Africa, the shortage system has so far obliged banks to hold minimal quantities of central bank money. In the most recent panic during the onset of the COVID-19 pandemic, this created trade-offs between the SARB's financial stability and monetary policy objectives. The trade-offs were resolved mainly by tolerating a smaller shortage, although the framework also created penalties for the banking system. These included punitive standing facility rates on the excess liquidity demanded by banks and then placed back at the SARB.

While these trade-offs would remain with a corridor system, they would no longer exist under a floor system. In a future crisis, banks would be starting with much larger liquidity buffers. Were additional liquidity injections to become necessary, it would be relatively straightforward to supply additional bank reserves, either through repo lending or open market operations. There would be no impact on interbank rates from the larger supply of liquidity, given the ability to pay interest on reserves.

[39] Ben Bernanke, 'Should the Fed keep its balance sheet large?', September 2016. https://www.brookings.edu/blog/ben-bernanke/2016/09/02/should-the-fed-keep-its-balance-sheet-large/

[40] Vasco Curdia and Michael Woodford, 'The central bank balance sheet as an instrument of monetary policy', *NBER Working Paper No. 16208,* pp 27-28. https://www.nber.org/system/files/working_papers/w16208/w16208.pdf

[41] Bank of England, 'The Bank of England's future balance sheet and framework for controlling interest rates', *Discussion Paper,* August 2018. https://www.bankofengland.co.uk/paper/2018/boe-future-balance-sheet-and-framework-for-controlling-interest-rates; Pontus Åberg et al., 'Demand for central bank reserves and monetary policy implementation frameworks: the case of the Eurosystem', *ECB Occasional Paper Series No. 282,* September 2021. https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op282~6017392312.en.pdf.

4.2.4 Regulatory dynamics

Textbook accounts of monetary policy implementation typically exclude regulatory frictions, but these can materially impact the functionality of a framework. Regulatory changes have also had larger effects on interbank markets since the global financial crisis. In choosing between floor and corridor arrangements, it is therefore important to consider regulatory dynamics.

Corridor systems require extensive interbank lending, which regulations tend to disincentivise, especially where that lending is unsecured. The following three frictions are relevant to the South African case:

- First, bank exposures to the central bank have a zero-risk weighting under the Basel III standards, so they carry no capital charge. Exposures to private banks do not receive the same favourable treatment.
- Second, central banks are exempt from the Large Exposures Framework, which limits banks' exposures to other institutions to 25% of their capital, and from 2025 will limit the systematically important banks' exposures to each other to just 15% of their capital.[42]
- Third, under International Financial Reporting Standard (IFRS) 9 standards, expected credit losses on central bank deposits are likely to be set at very low levels, marginally below those of the sovereign. This would reduce impairment charges relative to alternative investments.

By contrast, floor systems entail larger balance sheets for private banks, given a larger system-wide supply of bank reserves. This can be positive as central bank deposits count as high-quality liquid assets, enlarging the supply of qualifying assets and easing compliance with liquidity coverage ratios. However, larger balance sheets could force banks to hold more capital due to leverage ratios and might therefore be contractionary if banks prefer to cut back on other lending instead.[43]

[42] The sovereign is similarly exempted.
[43] Antoine Martin, James McAndrews and David Skeie, 'Bank lending in times of large bank reserves', *International Journal of Central Banking,* December 2016. https://www.ijcb.org/journal/ijcb16q4a5.pdf

In South Africa, banks hold enough capital, which would enable them to expand their balance sheets by making larger deposits at the SARB without being forced to raise more capital (or cut back on other lending). The SARB is also not undertaking QE or any such policy that would entail massive balance sheet expansions. It is nonetheless possible that floor systems could have this unintended contractionary consequence, in given scenarios. To address this problem, some jurisdictions have temporarily exempted central bank deposits from leverage ratios, including in the US, the euro area and Japan. In the US, the expiration of the exemption created some distortions.[44]

4.2.5 Complexity

A simple framework is always preferable to a complex one of otherwise equivalent capacity. Floor systems have been characterised as the 'simplest way to steer short-term rates', given that day-to-day operations for the central bank would mainly consist of paying interest on excess reserves (which can be automated). Banks would simply deposit excess funds at the central bank.[45]

By contrast, mid-corridor systems require careful liquidity forecasts and interventions to offset liquidity shocks from the central bank, while private banks must manage liquidity cautiously to avoid paying the penalty rates levied on the standing facilities. The simplicity criterion therefore favours floor systems. However, it is important to recognise that major reforms are also complicated, for which reason a complex transition to a simpler system would not necessarily be desirable. It would also be worth tolerating additional complexity to achieve a superior system, for which reason the SARB is not proposing a pure floor system.

[44] Jordan Jackson, 'How will the Fed's decision on the supplementary leverage ratio (SLR) impact markets?', 30 March 2021. https://am.jpmorgan.com/us/en/asset-management/institutional/insights/market-insights/market-updates/on-the-minds-of-investors/how-will-the-feds-decision-on-the-supplementary-leverage-ratio-impact-markets/

[45] Ulrich Bindseil, *Monetary policy operations and the financial system,* Oxford University Press, 2014, p 51. A similar point about the simplicity and robustness of floor systems is made by Nils Mæle, 'Monetary policy implementation: operational issues for countries with evolving monetary policy frameworks', February 2020, p 18, available at https://www.imf.org/en/Publications/WP/Issues/2020/02/07/Monetary-Policy-Implementation-Operational-Issues-for-Countries-with-Evolving-Monetary-48961

4.3 Advantages of mid-corridor frameworks

The preceding five sections identified considerations that favour floor systems. By contrast, the main attractions of mid-corridor systems are that they entail more active interbank markets and smaller central bank balance sheets, which implies less risk-taking. As discussed in the following two sections, these characteristics need not be perceived as advantages in all cases. However, in the SARB's thinking, these arguments still have force in the local context. This is because a pure floor framework, in South African conditions, would likely prevent liquidity from circulating adequately between banks. This could cause market rates to rise above the repo and oblige the SARB to respond with additional liquidity, thereby growing its balance sheet. On the principle that the MPIF itself should not be the driver of a bigger balance sheet and more risk-taking, these arguments incline the SARB to adopt a tiered floor system rather than a pure floor system.

4.3.1 The interbank market

Floor systems reduce activity in the interbank market. This occurs because the market is amply supplied with bank reserves and banks are not penalised for holdings excess liquidity. It is therefore more attractive to places excess funds at the central bank, which reduces incentives for interbank reserve trading. This helps explain why in the US, for instance, interbank lending declined from about US$100 billion daily before the global financial crisis, to around US$5 billion as of 2018.[46] (This was also affected by a loss of trust in some banks as well as regulatory changes which discouraged interbank lending.) Some degree of interbank trading persisted,[47] with new bank reserves still redistributed throughout the system over time.[48] Nonetheless, both theory and practice confirm that banks trade reserves less actively under floor systems.

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[46] Kyungmin Kim, Antoine Martin and Ed Nosal, 'Can the US interbank market be revived', *Finance and Economics Discussion Series, Federal Reserve Board*, November 2018. https://www.federalreserve.gov/econres/feds/files/2018088pap.pdf

[47] Ben R Craig and Sarah Millington, 'The Federal Funds market since the financial crisis', *Federal Reserve Bank of Cleveland Economic Commentary,* No. 2017-07, April 2017. https://www.clevelandfed.org/en/newsroom-and-events/publications/economic-commentary/2017-economic-commentaries/ec-201707-the-federal-funds-market-since-the-financial-crisis.aspx

[48] Huberto M Ennis and Alexander L Wolman, 'Large excess reserves in the United States: a view from a cross section of banks', *International Journal of Central Banking,* Vol. 11, No. 1, January 2015 (especially section 3). https://www.ijcb.org/journal/ijcb15q1a8.pdf

In scarce reserve systems such as the SARB's current shortage framework, interbank lending is crucial for distributing reserves between banks, so no institution is left either long or short. The same applies to a corridor system. However, this is a requirement of scarce reserve frameworks rather than a universal principle of monetary policy implementation. The market for bank reserves is, after all, unusual, in that it is dominated by a monopoly producer − the central bank − which aims to control prices and has a zero marginal cost of production. The market serves no price discovery function, and banks are instead meant to take whatever price is determined by the central bank (and specifically the Monetary Policy Committee, in the case of the SARB and other inflation targeters). This price can be realised with a limited reserve supply and extensive trading (a high turnover approach) or a larger reserve supply and less trading (a large stock approach). The best configuration will be whichever delivers the targeted policy rate more precisely as the actual price of bank reserves.[49]

The larger problem with floors and the interbank market is that banks could cease lending to each other altogether, except at a price materially above the policy rate. Given the option to place unlimited deposits at the central bank, and earn the policy rate, banks are unlikely to prefer lending to any other bank, given that the central bank is a safer borrower. For this reason, while the system as a whole might have ample liquidity, individual banks could find themselves short. This would be more likely in situations where liquidity was not super-abundant. To secure reserves in these

[49] Over and above this criterion, the literature identifies several other advantages of an active interbank market. One is that it provides information about funding conditions. A second is that interbank activity itself might assist policy transmission, perhaps by involving market participants more closely in the pricing of reserves. Some authors have claimed that this market forces banks to 'test their credit' with each other, thereby enhancing financial surveillance. Finally, there is also an argument that interbank markets are useful for achieving arbitrage between regions of different collateral quality. The last argument is convincing, but only applies to diverse currency zones such as the euro area. The other claims have fallen out of favour somewhat. The practical experience of using floor systems has not demonstrated problems with transmission. The interbank market is a relatively small part of the financial system and monitoring can occur elsewhere. Furthermore, there is little evidence that interbank markets provided unique or early warning of the global financial crisis, casting doubt on their surveillance value. For more on this debate, see Jean-Charles Rochet and Jean Tirole, 'Interbank lending and systemic risk', *Journal of Money, Credit and Banking,* Vol. 28, No. 4, November 1996, pp 733−762; William Allen, 'Bank of England open market operations: the introduction of a deposit facility for counterparties', *BIS Papers,* No. 12, 2002, p 431. https://www.bis.org/publ/bppdf/bispap12u.pdf; Bill Winters, 'Review of the Bank of England's framework for providing liquidity to the banking system', Box 5, October 2012. https://www.bankofengland.co.uk/-/media/boe/files/news/2012/november/the-banks-framework-for-providing-liquidity-to-the-banking; Jürgen Wiemers and Ulrike Neyer, 'Why do we have an interbank money market?', *IWH Discussion Papers*, No. 152, 2003. https://www.econstor.eu/handle/10419/77004; Tom Bernhardson and Arne Kloster, 'Liquidity management system: floor or corridor?', *Norges Bank Staff Memo* No. 4, 2019, p 9. https://www.norges-bank.no/globalassets/upload/publikasjoner/staff-memo/2010/staff_memo_042010.pdf?v=03/09/2017122442&ft=.pdf

circumstances, short banks would have to compete with the central bank by offering to borrow at rates above repo. The result would be market rates that would frequently trade above the policy rate. In turn, to improve monetary policy implementation, the central bank would have incentives to expand its balance sheet further. This problem is discussed in the next section.

4.3.2 Floor systems, the balance sheet and risk

Floor systems are associated with larger central bank balance sheets. To saturate the market, the central bank provides a large stock of bank reserves, which are its liabilities, and does so by acquiring more assets. In turn, these asset purchases can entail risk for the central bank. By contrast, corridor systems favour smaller balance sheets, relative to floors, and are therefore likely to reduce risk. While central banks cannot always avoid risk in their operations, these risks should be minimised, and the risks that cannot be avoided should be amply justified in terms of a central bank's mandates.[50] All other things being equal, a monetary policy implementation framework is preferable where it minimises risk relative to alternatives.

In South Africa, a floor system would not require a near-term balance sheet expansion. This is because the balance sheet has already expanded, for reasons independent of the monetary policy framework. The longer-run problem, however, is that liquidity would likely not circulate smoothly in a pure floor system, as discussed above. In a pure floor system, this would then incline the central bank to inject additional liquidity to keep rates close to the floor. This dynamic would produce consistent upward pressure on the central bank balance sheet, which could prompt risk-taking that would have been avoided with a corridor framework.

An alternative solution, however, would be to use quotas or tiers to constrain bank holdings of reserves, permitting a compromise between the reserve scarcity of corridor systems and the potential reserve excess of pure floor systems. This configuration is explored next.

[50] For a number of central banks, mostly in advanced economies, large-scale asset purchases have been necessitated by inflation-target undershoots and the zero lower bound constraint. These considerations have justified additional risk-taking, but these conditions do not apply to South Africa.

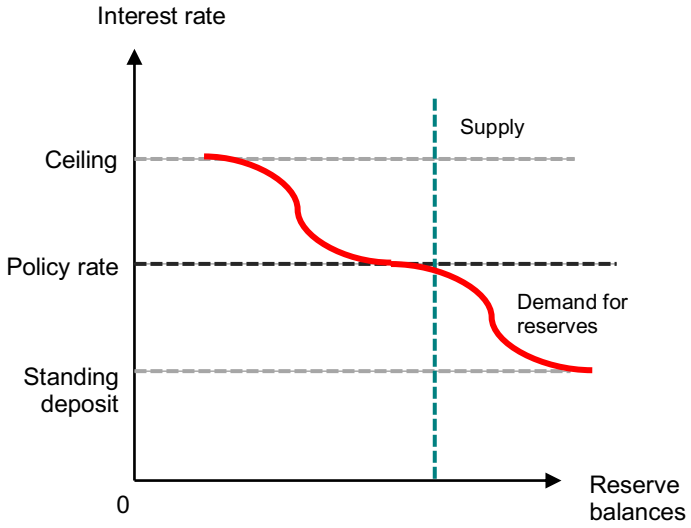
4.4 Tiered-floor frameworks

In New Zealand and Norway, two pioneers of floor systems, banks have not been able to earn the policy rate on all funds deposited at their central banks. Instead, banks have faced tiers (in New Zealand) or quotas (in Norway), with any funds in excess of these allowances remunerated at rates below the policy rate. These tiers or quotas prevented banks from hoarding funds and therefore conserved incentives for interbank activity. In doing so, they also prevented persistent growth of the central bank balance sheet by checking upward pressure on market rates, and with it, upward pressure on central bank balance sheets.[51]

Tiered floors are more complex than pure floors, but they otherwise retain many of the advantages of floor systems described above. Specifically, they still permit an ample supply of reserves, flexibility to undertake balance sheet policies, compatibility with regulatory shifts, and automatic absorption of excess liquidity. These characteristics suggest a tiered floor is likely to be the best choice for a new MPIF for South Africa. Much of the effectiveness of that framework would, however, depend on its finer design details. These are discussed in the following section.

[51] Banks' assessment of Norges Bank's liquidity management system, *Norges Bank Papers* No. 4, 2014. https://www.norges-bank.no/en/news-events/news-publications/Reports/Norges-Bank-Papers/2014/42014/

Stylised representation of a tiered floor system[52]



5. Design aspects of the proposed framework

5.1 Quotas

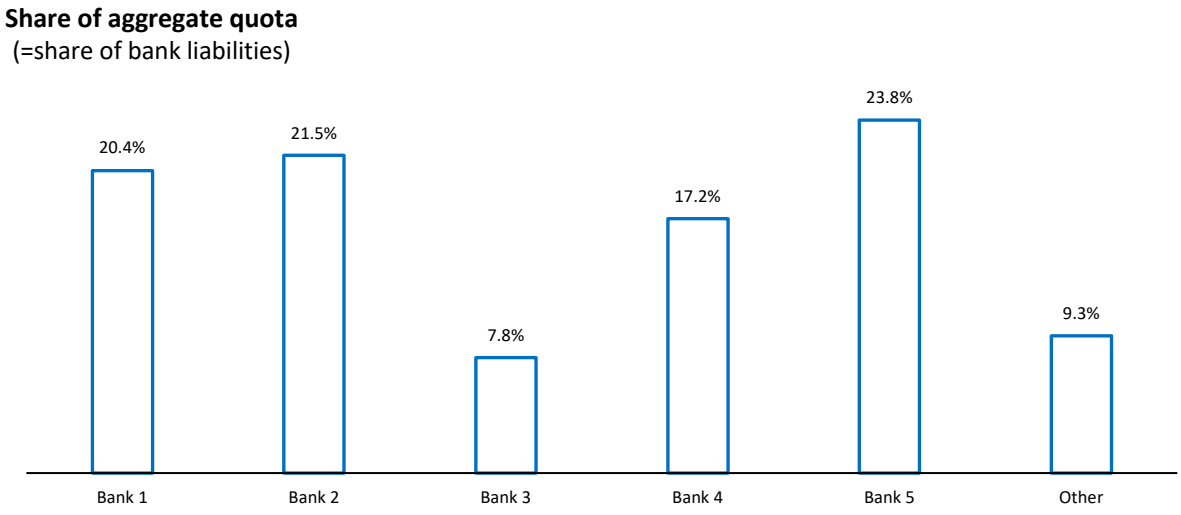
In both the New Zealand and Norwegian cases, quotas were designed so that, in aggregate, they exceeded plausible liquidity needs of the system as a whole. Individual bank allowances were scaled to reflect their relative sizes and payment needs. These quotas were revisited routinely (twice a year in Norway, for instance) and banks were permitted to request adjustments.

In South Africa, tiers or quotas would be introduced alongside the fundamental floor system reform, as a safeguard. In aggregate, these quotas could, in principle, be designed either to accommodate any plausible payment needs of the system or to absorb all liquidity the SARB wishes to place in the interbank market. The payment system is already able to absorb very large payments days − more than R1 trillion − as banks have access to their required cash reserves and intraday secured, interest-free loans. Accordingly, given that payment needs are already satisfied, quotas would be set to satisfy the SARB's desired liquidity expansion. In determining quotas, the SARB would therefore target the amount of liquidity it wished to inject, plus a buffer to cover liquidity shocks (such as movements in notes and coin), and set aggregate

[52] This chart is based on one in Darryl King and Tommaso Mancini-Griffoli, Chapter 5: Monetary operations, in Tobias Adrian, Douglas Laxton and Maurice Obstfeld, eds, *Advancing the Frontiers of Monetary Policy,* Washington, DC: International Monetary Fund, 2018.

quotas to at least that amount. This would allow banks leeway to absorb liquidity shocks without being forced into the standing facility, which would depress rates materially below the policy rate.[53]

A reasonable basis for assigning quota shares would be banks' existing cash reserve requirements, which are known numbers that are frequently updated and which correspond to balance sheet sizes. Indicative quotas for South Africa would provide the top five banks with around 90% of the total quota, with the balance split among the smaller banks. Quotas would be rounded up to whole numbers, which would also give small banks adequate access to quota facilities. Quota *allocations* would be revisited on a routine basis, probably twice a year, to ensure banks' shares of the aggregate quota remained aligned with their relative balance sheet sizes. Aggregate quotas would be revised as needed, to ensure equivalence with total liquidity in the system (including shock buffers).



5.2 Liquidity injections

Floor systems are effective at supporting interest rates above a given level, but keeping them close to that level, without upward drift, requires an abundant supply of

[53] This mechanism has been used to implement dual rates on reserves, where one rate is negative, allowing the market rate to be negative even as banks still qualify for a non-negative rate on their required reserves. See Andréa M. Maechler and Thomas Moser, 'Monetary policy implementation: how to steer interest rates in negative territory', 5 November 2020, available at https://www.snb.ch/en/mmr/speeches/id/ref_20201105_amrtmo/source/ref_20201105_amrtmo.en.pdf
In the South African case, the objective would be to avoid forcing banks into their quotas on a systematic basis, to avoid rates falling below the repo rate.

liquidity. As narrated above, the SARB has expanded its balance sheet substantially since the COVID-19 crisis. This provides scope for a liquidity expansion without a further balance sheet expansion: the SARB would be able to inject liquidity by unwinding existing draining operations, instead of acquiring new assets.

To better understand the quantities involved, it is helpful to consider some projections. These should not be mistaken for firm policy commitments, either in terms of quantities or timing. Nonetheless, for illustrative purposes, and making assumptions about the partial drawdowns of certain items, it is plausible that total excess liquidity could reach approximately R100 billion, without additional asset purchases.[54] This would be substantial relative to current required reserves of around R120 billion. The potential sources of this liquidity are specified in the table below.

Estimated excess liquidity under a tiered floor system	
Based on mid-2021 data; figures are purely illustrative, not final	
FX swaps outstanding	R57.4 billion
Debentures outstanding	R9.2 billion
CPD funds on call deposit at the SARB	R65.3 billion
NTSDA deposits	R41.1 billion
Subtotal	**R173.1 billion**
Less shortage	R46.5 billion[55]
New surplus	**R126.6 billion**
Assuming NTSDA drawdown is R30 billion[56]	**R115.4bn**

During the transition phase, the liquidity surplus is likely to be smaller, for three reasons. First, not all swaps would be matured (and it would be undesirable to drive FX-implied rates well below the repo rate by maturing too many swaps, much as it was undesirable to drive them well above the repo previously). Second, it may not be practical to reduce SARB holdings of CPD funds entirely. Third, the SARB would not have discretion over the timing of NTSDA drawdowns. Nonetheless, the SARB has

[54] These calculations use mid-2021 data and assume a steady demand for banknotes and coin.

[55] The shortage was larger than its year-to-date average when these figures were extracted and would likely be smaller when the transition takes place.

[56] This estimate is based on a plausible medium-term reduction in the NTSDA but does not reflect specific funding decisions by government.

ready options for expanding liquidity to a surplus of approximately R50 billion,[57] which is a likely overall surplus that would be targeted during the phasing-in period of the new framework.

Over the longer run, it will likely be necessary to expand reserves further. This problem should not arise for several years, given the scale of the near-term liquidity injection described above and the experience of other tiered-floor systems. Nonetheless, South Africa has a relatively high inflation rate, for which reason nominal reserves will likely have to grow over time to keep up with nominal gross domestic product (GDP). This requires some consideration of tools for introducing new liquidity.

First, it is important to appreciate why the proposed reserve balances are likely to exceed demand for an extended period. The system is currently able to settle interbank payments and satisfy reserve requirements with reserve balances of approximately R120 billion, a figure that has grown by 7% annually over the past four years (and 5% since March 2020). The transitional reserve expansion contemplated above could expand reserves by just over 40%, with further injections subsequently. The total liquidity expansion envisioned above could therefore entail a near-doubling of reserves.

Second, quotas will also constrain excess demand for reserves. In both the New Zealand and Norwegian cases, monetary policy implementation has been effective over long periods, with a stable reserve supply. In Norway, there has been no trend growth in bank reserves since quotas were introduced in 2011: the system opened with a liquidity target of NOK35 billion plus or minus NOK5 billion, and actual liquidity has largely remained within this range ever since. (The average balance for 2021 has been NOK33.4 billion, to date.) In New Zealand, the total supply of settlement balances was expected to average approximately NZ$7 billion when the 'cashed-up' system was introduced in 2006. Actual balances surpassed NZ$10 billion at one stage, but subsided again after the introduction of tiers, and were largely stable at close to NZ$7 billion subsequently, averaging NZ$7.4 billion in 2019. (In March 2020 the RBNZ undertook QE, expanding reserves substantially, but this was a monetary policy

[57] R50 billion is an approximate number which could be achieved using a mix of debentures, FX swaps and CPD funds, with the proportions at the discretion of the SARB.

decision and not one connected to the implementation framework.) These experiences show that tiered floor systems need not require rapid growth in central bank balance sheets.

Assuming that, over the long run, the SARB needed to expand reserves further, it would have two broad options: lending operations (with uptake at banks' discretion) or asset purchases (via open market operations at the SARB's discretion). Loans would likely be provided through repo auctions, which would have the attractive property that the returns would net off the costs of paying interest on reserves, with both pegged to the policy rate.

Asset purchases could involve foreign exchange reserves (either outright or via swaps/repos) or domestic sovereign instruments. Foreign exchange reserve assets would be costly for the SARB to acquire, given structural gaps between local and foreign interest rates. Nonetheless, were the SARB to accumulate additional reserves purely to enhance the resilience of the macroeconomy, this would simultaneously satisfy demands for additional bank reserves, pre-empting any need to expand bank reserves for implementation reasons. As for government securities, many central banks use open market operations in bonds or bills to manage liquidity. This option would not be costly for the SARB in terms of interest rate differentials, but would entail greater risk on the balance sheet. Bond purchases could also become problematic in the context of public concerns about perceived fiscal dominance.

5.3 Repo auctions

Under a floor system, the SARB should see limited demand at its weekly repo auctions. It would nonetheless be useful to retain these, even if they are generally under-subscribed. It is possible that individual banks might struggle to access liquidity even if the system as a whole were in surplus. Small banks, in particular, are likely to benefit from continued direct access to a SARB lending window instead of having to source liquidity through the interbank market. Repo lending could be an attractive option for meeting additional liquidity demands in the long run. Auctions would also provide useful information on banks' needs for liquidity. Furthermore, having an

established, non-stigmatised and non-punitive lending facility could prove valuable during periods of market instability.

At present, repo auctions provide funding up to an amount notionally equal to the shortage. In practice, the amount on offer has been R56 billion recently, despite a generally smaller shortage. Banks sometimes overfund relative to the shortage, but they have not taken the full R56 billion, and bids have been satisfied in full over the past year or so instead of being prorated. The system therefore closely approximates a fixed-price, full-allotment configuration. Under the new framework, this will become the *de jure* as well as *de facto* arrangement, with unlimited funds on offer at the repo rate. Banks would nonetheless be constrained in their demand for bank reserves, both by their supplies of eligible collateral and their quota accounts, with any funds in excess of quotas attracting the punitive standing facility deposit rate (the repo rate minus 100 basis points).

In some respects, this arrangement would amount to a zero-corridor framework, defined as one where the central bank both lends and borrows at the policy rate. This could be problematic in that zero-corridor arrangements are untested globally, and therefore perhaps riskier. However, given the quotas, this proposal is not a pure zero corridor. Rather, it would be a modified floor resembling Ulrich Bindseil's 'Taralac' arrangement ('targeted rate limited access'), with limited lending and depositing at the policy rate.[58]

The principal alternative to the fixed-rate, full-allotment system would be flexible-rate, fixed-allotment auctions, with a maximum quantity of funds on offer. This would provide further information about liquidity shortages, were prices to move above the repo rate. It would also discourage banks from excessive reliance on SARB borrowing.

Flexible-rate auctions require careful strategising by banks to optimise their bids, and the SARB would need to estimate appropriate auction quantities − two complexities avoided under the full-allotment, fixed-rate system. It would also be possible to learn about liquidity demands from bank bids under a full-allotment system through signals

[58] See Ulrich Bindseil, *Monetary policy operations and the financial system*. Oxford University Press, 2014, pp 80−83.

other than prices. Were banks to use the repo facility routinely, for large amounts, this would pose serious problems for a tiered floor, which would likely necessitate revisions to the auction format. Specifically, large-scale repo borrowing could leave the system overfunded, relative to quotas, creating incentives for long banks to lend below the repo at the end of the day to avoid the standing-facility penalty.

On the whole, the proposed system contains several features that should deter excessive repo usage, including an ample supply of reserves and quotas that would cap excess reserve demand. The combination of substantial liquidity buffers through quotas, substantial shock buffers built into quotas so they can absorb additional liquidity, and reserves averaging should nonetheless suffice to deter excessive repo borrowing. Overall, it would be preferable to retain the simplest repo arrangements, mainly as a safeguard, rather than build a more complex system that would ration funds, which is the basis for the fixed-rate, full-allotment proposal.

5.4 Standing facilities

The current MPIF uses a symmetric corridor with an overall width of 200 basis points. Over time, the SARB has varied the margins on the standing facilities on several occasions, both expanding and contracting the size of the overall corridor. During 2020, for instance, the deposit facility was lowered to 200 basis points below the repo to strengthen banks' incentives to lend in the interbank market rather than hoarding reserves. Section 2 of this paper details various other changes to the corridor since 1998. International experience also shows wide disagreement over corridor widths and repeated adjustments to corridors over time.[59] All this suggests that no proposal on standing facility rates is likely to be final: there is no global best practice.

Without firm evidence for the superiority of alternative arrangements and given a preference for minimising the total number of changes during the transition, the SARB intends to leave the standing facility rates unchanged. The standing lending facility would offer funds at repo plus 100 basis points, and the deposit facility would accept

[59] Adam Čáp, Mathias Drehmann and Andreas Schrimpf, 'Changes in monetary policy operating procedures over the last decade: insights from a new database', *BIS Quarterly Review*, December 2020, p 34; Ulrich Bindseil and Julius Jabłecki, 'The optimal width of the central bank standing facilities corridor and banks' day-to-day liquidity management', June 2011. https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1350.pdf

funds at repo minus 100 basis points. It is unlikely that a wider corridor would be helpful: a rise in lending rates of 100 basis points above the repo rate would already be a clear signal of impaired monetary policy transmission, so there would not be gains to permitting larger spikes. Individual banks that mismanaged their liquidity and therefore required emergency access to loans should also still face a penalty rate, which this system would provide. A case could be made for a narrower corridor, and the SARB would have the option to review the width of the corridor in future. But any such exercise would best be informed by data on the functioning of the new system.

5.5 Reserve requirements under a reformed MPIF

Under a floor system, banks would earn interest on excess reserves, which would be deposited in the standing facility. Required reserves would remain unchanged at 2.5% of liabilities and would continue to be unremunerated. Banks would still need to achieve their reserve requirement, on average, over the existing 30-day period, commencing on the 15th working day of each month. Undershoots would continue to be treated as serious breaches. Banks would continue to hold a separate cash reserve account, which would not be remunerated. Quota balances would not count towards meeting the average cash reserve requirement.[60]

5.6 Transition arrangements

In shifting to a floor system, the SARB would need to adjust the supply of liquidity to the market and establish the floor by introducing quotas and paying interest on these balances. Following the New Zealand precedent, a gradual transition of around three to six months would be preferable to a ‘big bang’ change. To facilitate a smooth transition, the SARB would map out a detailed transition plan and share the key arrangements with market participants. The basic arrangements would involve reducing the size of the shortage and then creating a surplus by unwinding existing liquidity-draining interventions. This surplus would be small initially but would be increased steadily, and would always be matched by quotas sufficient to absorb the targeted surplus as well as plausible liquidity shocks. The ‘quotas’ would represent

[60] There is a larger debate in the literature on the wisdom of cash reserve requirements, which act as a tax on lending, at least where they are not remunerated. However, MPIF reform does not require changes to the cash reserve ratio (CRR) and any such recommendations would have to be based on a cost-benefit analysis, which is beyond the scope of this paper. For this reason, no adjustment to the CRR percentage is proposed here.

amounts that banks would simply retain overnight in the South African Multiple Option Settlement (SAMOS) payment system. Qualifying balances would be identified as the system rolled into night window; separate quota accounts could probably be avoided.

6. Theory and verification of monetary policy transmission

6.1 Theory of transmission

The shortage system has been premised on a theory of transmission centred on banks' marginal funding costs, with an adjoining requirement for banks to hold certain kinds of assets for use in repo auctions (as discussed in section 3).[61] In a floor system, banks are not forced to borrow from the central bank. Much the same applies in corridor systems. The theory of transmission should therefore be specified somewhat differently – although in practice the channels of policy transmission will remain much the same.

6.1.1 Controlling the short end of the yield curve

In the new framework, the core function of the implementation framework would be seen as pinning down the yield curve. This means setting the yield for the safest and most liquid rand asset available.[62] In turn, starting with this interest rate, the financial system can construct pricing for many other kinds of rand assets, incorporating factors such as term premia, risk premia, and expectations for future policy rates.

Central banks, or more appropriately, central banks operating *fiat* money systems[63], are well positioned to control yields at the short end of the curve. This is because they are the sole issuers of bank reserves, the final means of payment used by banks to

[61] An explanation is available on the SARB website under 'Monetary policy implementation framework', at https://www.resbank.co.za/en/home/what-we-do/financial-markets/monetary-policy-implementation-framework

[62] This is the case with orthodox interest rate policy. Unconventional policies such as quantitative easing (QE) work through lowering other longer-term interest rates, with the supply of reserve money serving to fund asset purchases rather than change the price of central bank reserves. That said, a key transmission channel of QE is short-rate expectations, so even in this case, expected short rates are important. See Ben S Bernanke, 'The new tools of monetary policy', 2020 American Economic Association Presidential Address, 4 January 2020. https://www.brookings.edu/blog/ben-bernanke/2020/01/04/the-new-tools-of-monetary-policy/

[63] This would not be true, for instance, of central banks operating pegs to other currencies.

settle their transactions.[64] These assets are safe because their face value never fluctuates, and liquid because they are the final means of payment. In the context of a floor framework, the policy rate becomes the return on an overnight deposit at the central bank, which is the safest and most liquid asset conceivable for the given currency.[65] However, the theory of transmission would be much the same in a corridor system, with the central bank endeavouring to ensure bank reserves would be predictably available on the interbank market at the policy rate.

In both the floor and corridor cases, transmission works through arbitrage. If another perfectly safe and liquid asset were to yield a rate higher than the policy rate, banks would sell reserves and buy that asset until the prices matched.[66] Were an asset to provide a yield consistently above the policy rate, that would likely reflect risk and term premiums, or some friction that prevented markets from completing the arbitrage trade. By contrast, a yield below the policy rate would likely be explained by expectations for lower policy rates over the term of the specific asset. Alternatively, for an asset such as a consumer deposit, it might also reflect the bundling of payment services with the deposit product, as well as frictions such as imperfect competition for deposits. Overall, given that most assets have inferior liquidity and safety relative to central bank deposits, markets will generally price assets at margins above the

[64] Arguably, the issuance of this highest-quality settlement money is the defining characteristic of central banks, rather than playing a lender-of-last-resort role – see Ulrich Bindseil, *Central banking before 1800: a rehabilitation,* Oxford University Press, 2020. Note that there is a clear distinction between a rand which is a liability of the central bank and must be held in a SARB bank account, and a rand held in an account at a private bank, even though most accounts conflate the two. The distinction is clearer in commodity-based money systems, such as the gold standard, where banks settled between each other in gold at the central bank, or in central bank money directly backed by gold, but provided a vastly larger supply of money to the larger economy through their own credit operations. In these cases, the exchange rate of gold to private money was intended to be fixed, but it could and sometimes did change. In theory, the exchange rate of reserve money to privately created money could also fluctuate, but as central banks operating *fiat* money systems need not suffer runs, these pegs are much less fragile than gold pegs. An accessible explanation of the subject is Pontus Rendahl and Lukas B Freund, 'Banks do not create money out of thin air', 14 December 2019. https://voxeu.org/article/banks-do-not-create-money-out-thin-air

[65] Banknotes, also a SARB liability, arguably share the same properties, although these are cumbersome to store safely and to use for large payments. They also traditionally receive no return, and it would be impractical to pay interest on them, for which reason their pricing does not shape the yield curve. A SARB rand deposit is maximally safe because the SARB can never experience a run on liabilities it can create.

[66] Symmetrically, if the yield is below repo then the holder would have an incentive to sell it off to acquire bank reserves instead, and the lower price of the asset would produce a higher yield, with the arbitrage trade causing the yield to converge to the repo rate.

policy rate (or more correctly, above policy rate repo expectations) to compensate for the term and risk premia inherent in these investments.[67]

6.1.2 The policy rate in contracts and benchmarks

While monetary policy transmission involves markets repricing large quantities of assets as expectations of monetary policy change, in practice there are two conventions which simplify this process and also enhance the transmission of South African monetary policy. One could be described as legal or customary, reflecting the implicit role of the official repo rate in many contracts, such as mortgages. The second has to do with benchmark short-term rates that are used to price assets such as derivatives. The fact that monetary policy has strong effects on both these kinds of benchmarks is consistent with the claim that monetary policy works by pinning down the short end of the yield curve, providing a basis for pricing other assets.

On the first benchmark, the South African practice, in common with countries such as Australia and the United Kingdom, but in contrast to others such as the US, is for a wide range of household and business loans, such as mortgages, to be pegged to the repo rate set by the central bank. This typically works via the prime rate, which is itself the repo rate plus a premium (which is fixed at 3.5 percentage points, although banks are free to offer loans at spreads on either side of the prime rate). When the MPC changes the repo rate, this decision transmits to the economy through a large range of floating-rate contracts legally connected to this benchmark rate. The SARB is fortunate that its repo tool has greater reach due to the convention of pricing many other rates to this benchmark.

By contrast, in countries such as the US, instruments such as mortgages tend to have fixed rates linked to long-term Treasury bonds. These long-term rates are connected to short-term rates through the yield curve's term structure, but the connection between lending rates and the central bank policy rate is looser, and it is possible for

[67] For a fuller exposition of this theory of transmission, see Antoine Martin, James McAndrews and David Skeie, 'Bank lending in times of large bank reserves', *International Journal of Central Banking,* December 2016. https://www.ijcb.org/journal/ijcb16q4a5.pdf

long rates to fall even as short rates are rising (as in the 'Greenspan conundrum' of the mid-2000s).

The second benchmark follows more directly from market pricing for bank reserves, which feeds directly into benchmark rates, the most important of which are Sabor and Jibar.[68] It is difficult to quantify precisely how large these markets are, but the Jibar-linked market alone includes derivatives worth nearly R40 trillion as well as R2 trillion in non-derivatives.[69] This is larger, for example, than the entire local currency government bond market (currently R2.9 trillion).

Despite this tight connection between the pricing of reserve money and the larger financial system, short-lived fluctuations in interbank rates need not have material consequences for these other rates, as it is the expected short rate over time that transmits to the yield curve. Policy will, in general, transmit effectively if any deviations from the policy rate are brief and minor. By contrast, a persistent oversupply of cash reserves would drive down the price of interbank funding, thereby lowering other rates connected to this market, such as Jibar, as occurred in mid-2020. By contrast, a persistent undersupply would have the opposite effect. It is also plausible that sustained deviations in market rates from the repo rate would change the treatment of the prime rate in contracts. Providing that the SARB maintains an effective framework for monetary policy implementation, however, transmission is likely to remain robust, bolstered by the ongoing and widespread use of repo-linked benchmarks in contracts.

6.1.3 Tiers and market rates

Based on international experience, the most likely pricing outcome of a tiered floor system is that interbank rates will move close to, but slightly below, the floor. Banks with surplus funds (relative to quotas) will have to provide incentives for banks with quota space to borrow the excess balances. These deviations are likely to be very small, however, as most funds will be placed directly with the SARB, at the repo rate,

[68] The South African Benchmark Overnight Rate and the Johannesburg Interbank Average Rate

[69] SARB, 'Consultation paper on selected interest rate benchmarks in South Africa', August 2018. https://www.resbank.co.za/content/dam/sarb/publications/media-releases/2018/8734/Consultation-Paper-30-August-2018.pdf

given that quotas will exceed total surplus liquidity.[70] Banks will also have the option to place temporary excess balances in their cash reserve accounts, where averaging is permitted, which will provide an alternative to interbank lending. Additionally, banks may avoid 'gouging' other banks with surplus funds to avoid retaliatory pricing on subsequent occasions when surplus liquidity is distributed differently.[71] Overall, given that the current framework is creating larger incentives for rates to trade below the repo rate, with the system often in surplus, the shift to a tiered floor is likely to move interbank rates marginally closer to the repo, improving transmission slightly. The spread is also expected to remain constant over time, so changes in policy will transmit fully.[72]

6.1.4 Real-economy effects

In principle, floor and mid-corridor systems have identical effects on larger macroeconomic variables, assuming that both systems function normally and transmit the same policy rate. Implementation questions are also wholly separate to assessments of the optimal inflation target or the macroeconomic conjuncture, and should be rigorously distinguished. There are nonetheless some limited caveats to the general claim that macroeconomic variables will be unaffected by the choice of MPIF.

One obvious consideration is that floor systems are more amenable to balance sheet policies than corridor systems, and that balance sheet policies can have macroeconomic effects. It would nonetheless make more analytic sense to attribute such consequences to the specific policies rather than the general framework. In one sense, however, floor systems are distinct in that they necessarily entail larger supplies of liquidity to the banking system. If lending is a tradeoff between extending credit and managing liquidity risk, a larger supply of safe liquidity will favour more

[70] There are no large institutions with SAMOS that are ineligible for interest on reserves, as there are in other jurisdictions, which is a regulatory idiosyncrasy that has hampered policy implementation elsewhere but is not expected to apply locally – see for example Annexure 4 on the Bank of England experience.

[71] In game theory terms, this is an iterative game in which a cooperative strategy is likely to form a stable equilibrium, with scope to punish defectors. This effect is likely to be stronger in a smaller market such as South Africa's, and weaker in a large and anonymous market.

[72] On the effectiveness of implementation where policy changes are completely transmitted, see Simon Potter, 'Money markets at a crossroads: policy implementation at a time of structural change', 5 April 2017, pp 6−7. https://www.bis.org/review/r170410a.pdf

lending by reducing or eliminating liquidity premia.[73] One author has also modelled minor macroeconomic effects from depositors receiving higher interest rates from banks in floor systems, as banks pass on savings from cheaper access to liquidity.[74] These findings suggest some departures from strict MPIF macroeconomic neutrality, but not in problematic directions.

In an emerging market context, it is difficult to identify any special characteristics that would generate larger macroeconomic consequences. Perhaps the most plausible is that with greater supplies of liquidity, banks could more effectively arbitrage away price discrepancies. But in South Africa the effects are still likely to be modest, given a relatively developed financial sector. The direction of change would be also unproblematic, once again, merely enhancing policy transmission.

6.2 Interest rate benchmarks

An interest-rate-based monetary policy can be implemented either through targeting a specific market rate and intervening in the relevant market to steer that rate, or by the central bank offering facilities where it either charges an interest rate to lend or pays a rate to borrow. Floor systems fit into the second of these categories, with the heavy lifting of monetary policy implementation taking the form of interest on excess reserves, paid at the policy rate. Even with administrative systems, however, it is essential to consult market rates to evaluate monetary policy transmission, for which reason it is necessary to identify relevant benchmarks.

6.2.1 Framework reform and reference rate reform

In the South African case, this task is complicated by the reference rate reform process, with existing benchmarks being retired and new ones introduced. This means there is no viable benchmark currently available which will remain relevant for the foreseeable future. However, while this would be a significant stumbling block for a framework based on a specific market rate, the problem is less acute with an

[73] Javier Bianchi and Saki Bigio, 'Banks, liquidity management and monetary policy', *Econometrica* (forthcoming), 2021. http://www.javierbianchi.com/uploads/8/8/5/8/8858198/banks_bb.pdf

[74] Peter Ireland, 'The macroeconomic effects of interest on reserves', *NBER Working Paper 18409*, September 2012. https://www.nber.org/system/files/working_papers/w18409/w18409.pdf

administrative system. Indeed, given that the current shortage system does not utilise the proposed reference rates, there would be no loss of existing monitoring ability by upgrading to a tiered floor system. The SARB would aim at keeping the price of bank reserves close to the policy rate, and rely on existing measures – Jibar, Sabor, FX-implied rates and the effective policy rate – to verify transmission. In this way, MPIF reform could precede reference rate reform.

Once reference rate reform is completed, however, the SARB would probably wish to choose a specific rate as its primary benchmark for monitoring policy transmission. There would be three main candidates: the South African Rand Interbank Overnight Rate (ZARIBOR), South African Rand Overnight Index Average (ZARONIA) and South African Secured Overnight Financing Rate (ZASFR). (Of the alternatives, Jibar is due to be phased out, and it is also a more limited measure than the ZARIBOR, making it clearly inferior. There are also two term rates in the reference rate reform project: one for financial sector deposits and one for deposits by non-financial corporates, but as these tenors extend to one year, they are not good targets for monetary policy, where short-term rates are the focus.) The distinguishing feature of ZASFR is that it is a secured rate. By contrast, ZARIBOR and ZARONIA are unsecured rates. ZARIBOR covers interbank transactions only, while ZARONIA refers to a larger set of unsecured transactions, including bank deposits made by non-financial corporates.

The advantage of the ZASFR is that it more closely approximates the type of funding offered in repo auctions, where the SARB injects liquidity against high-quality collateral. If the SARB targets an unsecured market rate, but then provides liquidity to a different kind of market, it is more likely that rates will diverge between the two markets. Unfortunately, the ZASFR is expected to be a relatively weak rate. Trading volumes for qualifying instruments are low, making it only marginally relevant for financial markets in general.

The advantages of ZARIBOR and ZARONIA are that they will have more bearing on financial market conditions. ZARONIA offers wider scope, because it incorporates a larger pool of funds and has a lower cut-off for transaction size (R20 million rather than R50 million). It is therefore likely to be the highest-quality market rate available to the

SARB. ZARIBOR, however, will be a better descriptor of conditions in the bank system where the SARB transacts. Unlike banks, non-banks can only hold SARB liabilities in the form of banknotes and coin, not central bank money, which is the asset for which monetary policy sets a price. ZARIBOR is therefore the most likely realistic target for the MPIF and should therefore be the benchmark.[75]

This choice is supported by international practice. International Monetary Fund (IMF) data show that interbank rates are targeted by about half (51.8%) of the 85 central banks that use a market rate as an operational target. A quarter (25.1%) of these central banks targeted 'short-term rates', with no more precise definitions offered. For the balance of the sample, practices varied quite widely, incorporating practice such as short-term Treasury bill rate targeting. The modal arrangement is clearly to target unsecured interbank rates, but this is far from being a consensus position.

6.2.2 A pluralist approach to verification

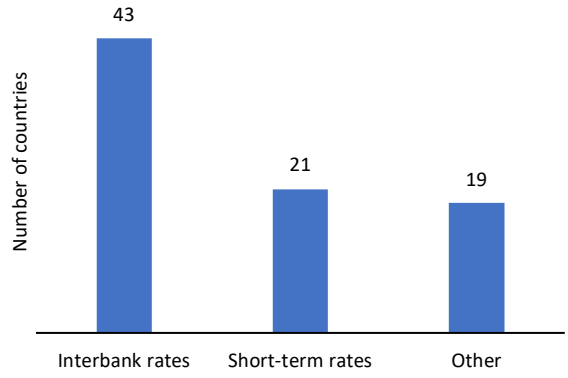
Even if one rate, such as ZARIBOR, were chosen as the MPIF benchmark, it would be unrealistic to ignore all other rates when monitoring monetary policy implementation. Over the past year, for instance, FX-implied rates have been volatile and unusually elevated, prompting close monitoring by the SARB as well as repeated interventions to improve liquidity conditions in the forward market. It is conceivable that such situations could recur, in which a non-benchmark rate would nonetheless require special attention from the SARB. Such interventions would not be difficult under a floor system; the SARB could, for instance, moderate FX-implied rates by entering into new rand-injecting swaps, with the additional rand liquidity then managed through quotas. The point is that, even with a benchmark rate, other rates would remain relevant for monetary policy implementation and would not be ignored.

In summary, with a floor system, the SARB could proceed with MPIF reform prior to the finalisation of the reference rate reform process. Over time, the most plausible

[75] A further consideration is that a floor system will tend to reduce interbank activity, potentially lowering the volume and number of trades captured by the ZARIBOR benchmark. That said, the SARB's fundamental objective is to monitor and control the price of central bank reserves. Given that the SARB would be observing most reserve borrowing and lending directly as a participant in those trades, an important role of ZARIBOR will be to detect anomalies in the form of market rates deviating from the target. In this context, as with a security camera in a bank vault, a lower number of observations would not be something to regret.

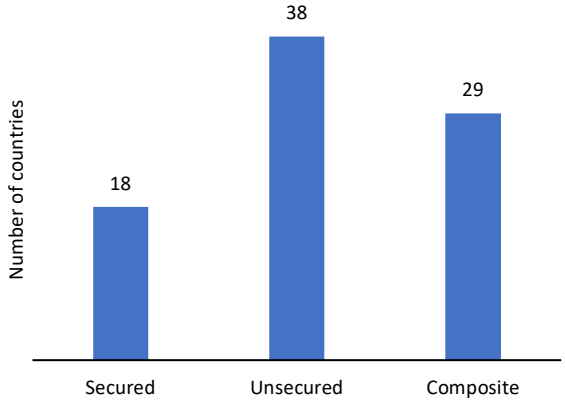
benchmark rate is likely to be ZARIBOR, in line with the majority preference of central banks for using an unsecured interbank rate. Having a benchmark would help ensure the verifiability of policy implementation. That said, it is unlikely that the SARB could focus solely on one rate and ignore all others, where they diverged from each other.

What market rate is targeted?



Source: IMF MOID

What kind of market rate is targeted?



Source: IMF MOID

7. Conclusion

The current monetary policy implementation framework is becoming inadequate. The Covid-19 crisis has demonstrated the need to progress to a more robust framework. The SARB is therefore proposing a shift to a tiered-floor system.

A tiered floor would provide South Africa with a simple and flexible framework for implementing monetary policy. It would absorb surplus liquidity more cheaply and effectively than current tools and provide flexibility to conduct balance sheet policies, if needed. Moving to an ample-reserves framework would also likely yield financial stability benefits through a larger supply of safe and liquid assets to the banking system.

Although floor systems were an unknown quantity a decade ago, they have now been successfully operated by a range of prominent central banks. The two main objections to floor systems are that they reduce interbank activity and entail larger central bank balance sheets. However, the SARB has already moved to a larger balance sheet system through asset purchases, mainly to accumulate foreign exchange reserves.

The proposed framework reform would not expand the SARB's balance sheet as much as it would better insulate monetary policy implementation from other objectives. Regarding the interbank market, the new framework may reduce interbank activity, but floor systems do not require high market turnover to achieve an allocation of reserves compatible with central bank policy rate decisions. In both cases, the existence of tiers would mitigate the risks by retaining incentives to trade, capping banks' access to fully remunerated cash reserves and shielding the SARB's balance sheet from excess growth. Following a period of public consultation and the incorporation of inputs, the SARB anticipates that the new framework will be implemented during 2022.

Annexure 1: Summary of proposals

The South African Reserve Bank (SARB) aims to adopt a **tiered floor system** for implementing monetary policy, with interest on excess reserves paid at the policy rate, but only up to a given tier/quota.

The **interest rate on excess reserves would always be the policy rate**, as long as reserves are within each bank's quota. Any reserve holdings in excess of quotas would be remunerated at the standing deposit facility rate, that is, the repurchase (repo) rate minus 100 basis points. Required reserves would remain unremunerated, and excess reserve holdings would not be counted towards required reserves. Banks would not be obliged to fill their quotas.

Quotas would be determined by the SARB as the total amount of surplus liquidity the SARB wishes to provide to the market, plus a margin for system-wide liquidity shocks, divided between banks according to their existing share of total required cash reserves. This means **quotas would be proportional to banks' liabilities**, as these are used to calculate required reserves. Quotas would be rounded up to round numbers for simplicity. Quotas would be revised periodically, approximately twice a year, but more frequently during the transition period when they would be increased frequently to match the expansion in surplus liquidity. Any overall expansion of liquidity initiated by the SARB should always be matched by an overall increase in banks' quotas.

Repo auctions would be offered on Wednesdays, as is currently the case. These **repo auctions would follow a fixed-rate, full-allotment format,** with the fixed rate equal to the policy rate. This rate will still be known as the repo rate.

The **standing lending facility would remain in place** at repo plus 100 basis points. The standing deposit facility would also remain at repo minus 100 basis points, although it would now only attract liquidity in excess of quotas.

During the introduction of this system, **liquidity would be injected through unwinding or maturing existing sterilisation operations, involving debentures,**

Corporation for Public Deposits (CPD) funds and foreign exchange (FX) swaps. Over the longer term, if additional liquidity were required to keep interest rates at the floor, this would be provided through repo loans to banks or outright purchases of assets. The appropriate mix of instruments would first be determined by the SARB's mandates, and second, by profit and loss considerations.

The **SARB would assess monetary policy transmission using the existing battery of indicators**, including the South African Benchmark Overnight Rate (Sabor), Johannesburg Interbank Average Rate (Jibar) and FX-implied rates. Following the completion of the reference rate reform – the South African Rand Interbank Overnight Rate (ZARIBOR) – a measure of unsecured interbank lending will likely become the primary benchmark. The SARB will continue to monitor other rates and will have the option to intervene if monetary policy transmission is compromised. A floor system does not require a single market target, as the main operational mechanism is the automatic payment of interest on excess reserves at the policy rate.

Annexure 2: Frequently asked questions

What is the difference between a monetary policy framework and a monetary policy implementation framework?

A monetary policy framework (MPF) sets out the objectives for monetary policy. South Africa uses an inflation targeting framework with a target of 3-6%, and the responsibility for achieving this objective lies with the Monetary Policy Committee (MPC) convened by the governor. The MPC adjusts the repurchase rate (monetary policy decision), as deemed necessary, in order to achieve the inflation target of 3-6%.

The monetary policy *implementation* framework (MPIF) provides the practical mechanisms for achieving the inflation target objective. That is, the implementation framework gives effect to the monetary policy decision. In the South African case, implementation is conducted by the Financial Markets Department under the supervision of a designated Deputy Governor.

To clarify, consider an analogy. For a car trip, the objective might be 'Cape Town' and the implementation framework would be a car. The policymaker would be a driver manipulating the steering wheel, accelerator, brake pedal and other controls to navigate the road to Cape Town. If a driver brakes but the car does not slow down, that would be an MPIF problem. By contrast, if the driver gets lost and reaches Gqeberha instead, that would be a failure in terms of the MPF but not evidence of a dysfunctional MPIF. The reform discussed in this paper would change the MPIF but not the MPF.

How will the proposed reform affect MPC decisions?

The proposed reform would not affect MPC decisions. The MPC would continue to use a short-term rate to achieve an inflation target. The inputs into that decision process, including the forecasting framework, would be unchanged. Monetary policy implementation may become slightly more effective under the new framework, and would also function more reliably in a crisis. However, the existing forecasting framework has not assumed frictions in transmission and would not require

substantive recalibration, over and above the routine re-estimations that would be conducted for any workhorse economic model.

Do any emerging markets use floor systems? If not, is this a problem?

Although we have found references in the monetary policy implementation literature to emerging markets using floor systems,[76] on investigation these cases appear not to involve deliberately constructed floor systems but rather excess liquidity situations where rates moved to the lower bounds of central bank corridors. We are not aware of an emerging market that currently uses a fully-fledged floor system. However, in consultation with international experts, we have also not identified any reasons why this should be a problem for South Africa, given the depth, liquidity and sophistication of its financial markets.

How can the South African Reserve Bank afford to pay interest on reserves?

At first sight, paying interest on reserves would appear to be a significant new expense for the South African Reserve Bank (SARB). However, the SARB is already bearing costs by draining liquidity using other tools, often at rates above the policy rate. By changing the *composition* of its liabilities, rather than the overall supply of liabilities, the SARB is likely to limit costs rather than expand them. In other words, while this reform will entail a new expense, it will also reduce other forms of spending, and it is important to think about the net effect on costs rather than just the new cost item.

Considering the asset side of the balance sheet, under the current system the SARB earns a profit on lending to banks to fill in the shortage. Under a surplus system, this lending (called 'accommodation to banks') is no longer needed as banks are not short, so this profitable business line falls away. However, banks still face a reserve requirement which is unremunerated. This demand for SARB liabilities is no longer matched by profitable lending to banks, but it is still available to finance other assets – such as those the SARB acquired during 2020. The profitability of these assets varies: foreign exchange reserves earn less, while the monetary policy portfolio earns more. Because money is fungible, it is not possible to say which assets are supported

[76] See for instance Nils Mæle, 'Monetary policy implementation: operational issues for countries with evolving monetary policy frameworks', February 2020, footnote 38, p 18, available at https://www.imf.org/en/Publications/WP/Issues/2020/02/07/Monetary-Policy-Implementation-Operational-Issues-for-Countries-with-Evolving-Monetary-48961

by banks' unremunerated reserve requirements, and which are supported by other more expensive liabilities. But the scope to finance some assets, at zero cost for the SARB, remains in place in both frameworks.

In future, the SARB could add to its assets by using the new tool of paying interest on reserves to manage an expanded supply of liabilities, which would increase interest costs. In this scenario, however, the ultimate profit and loss implications would depend on the returns on assets accumulated with these reserves, not just the cost of liabilities. For instance, lending to banks at the repo rate, and taking deposits at the repo rate, would entail a net cost of zero for the SARB. Other assets could be either more or less profitable, but in general, profitability considerations would be subordinate to the SARB's policy objectives.

What is wrong with the current framework?

The existing shortage system has mostly served the SARB well since it was adopted in 1998. However, shortage systems work best when there is a structural liquidity deficit, meaning the market is naturally short and needs to come to the central bank for financing. This usually happens because of growth in banknotes and coin, which banks can source from the SARB to supply to their customers, only by reducing their reserve balances. (Required cash reserves can also be raised to expand market shortages, although the SARB has not adjusted these requirements for many years, given their contractionary effects on credit extension.)

Shortage systems experience greater strain where the market is naturally in surplus, particularly if the surplus exceeds the capacity of instruments used to drain liquidity (such as debentures). With a large structural liquidity surplus, it can be difficult to maintain an adequate shortage, or a shortage of any size; it might also be expensive and distortionary to do so.

The SARB faces all three problems: it is draining substantial quantities of liquidity at a high cost; by draining liquidity, it is tolerating distortions in some markets, especially the swap market; and finally, it is accepting an unusually small shortage, and with risks this could disappear entirely.

Switching to a floor-type system would provide the SARB with a framework that would be significantly less vulnerable to liquidity shocks, as well as being cheaper to operate and less distortionary. In addition, it is anticipated that the framework reform may have further benefits, for instance by enhancing financial stability through an expanded supply of perfectly safe and liquid assets.

Floor systems are associated with quantitative easing (QE). Does this reform imply the SARB will be adopting QE?

The SARB will not need to conduct QE to implement this system, either during the transition or subsequently. While the connection between QE and floor systems has to do with the problem of excess liquidity, and more specifically how to control the price of central bank money when the supply of that money is abundant, QE is not the only possible driver of excess liquidity, and it is not relevant in the South African case.

QE is a policy of asset purchases, typically of sovereign and sometimes corporate bonds, used when a central bank is constrained by the zero lower bound and wishes to lower rates further along the yield curve. It is often used in the context of deflation risks. South Africa is not in this situation and the proposed monetary policy framework has no bearing on the likelihood of South Africa experiencing those conditions.

Instead, South Africa is aiming to move away from a shortage system to one where there is ample but not super-abundant liquidity, as there would be with QE. This more closely resembles the New Zealand experience, where a ‘cashed up’ system was adopted, with tiered floors, more than a decade before QE was used. Given the size of the SARB’s current balance sheet, ample liquidity will be achievable without additional rounds of new asset purchases as part of the monetary policy implementation framework (MPIF) transition.

Over the medium term, it will likely be necessary to expand interbank liquidity further, if only to keep up with nominal gross domestic product (GDP) growth. There are different options for providing liquidity under these circumstances, none of which qualify as QE. Historically, a major source of new liquidity has been foreign exchange (FX) reserve accumulation, a trend that might persist in future (including through FX swaps to inject rands). Banks could also acquire liquidity through weekly repurchase

(repo) auctions. Finally, the SARB could purchase government bonds through open market operations, a policy that has long been used by central banks (such as the Bank of Japan, the Bank of England and the United States Federal Reserve) for managing liquidity.

What happens if banks lend their new excess reserves out? Would the larger supply of money lead to inflation, with too much money chasing too few goods?
A common misconception about central bank money is that banks lend it out into the economy, and if they are holding excess balances then that indicates they are failing to lend.[77] In truth, the central bank money issued by the SARB must be held by institutions with South African Multiple Option Settlement (SAMOS) accounts, of which there are 33, including the SARB itself. Any bank that wishes to spend or lend out its holdings of central bank balances can only do so by transferring them to another institution in the SAMOS system. It is not possible to make transfers outside of the system. The overall supply of liquidity to the system is (almost[78]) entirely at the discretion of the SARB, which is the monopoly supplier of these reserves.

Historically, many central banks, including the SARB, have made it costly for banks to hold reserve balances, for instance by remunerating them at a penalty rate, or not at all. This has caused banks to economise on reserves, holding only the bare minimum necessary to satisfy their regulatory obligations, creating the impression that there is a stable 'money multiplier' and that larger supplies of central bank money would lead to more lending (and ultimately more inflation). In fact, banks make loans based on expected returns net of costs, with the price of central bank money rather than its quantity being the crucial factor for lending.

[77] Two good discussions of this misconception are: Todd Keister and James McAndrews, 'Why are banks holding so many excess reserves?', *Current Issues in Economics and Finance,* Volume 15, Number 8, December 2009, available at https://www.newyorkfed.org/medialibrary/media/research/current_issues/ci15-8.pdf; and Paul Sheard, 'Repeat after me: banks cannot and do not 'lend out' excess reserves', 13 August 2013, available at https://www.hks.harvard.edu/sites/default/files/centers/mrcbg/programs/senior.fellows/2019-20%20fellows/BanksCannotLendOutReservesAug2013_%20(002).pdf

[78] Reserve balances are also affected by demand for notes and coin, with banks drawing down their reserves to receive notes and coin from the SARB, where banks' customers demand them. Both central bank reserves and notes and coin are liabilities of the central bank, but notes and coin are the only central bank liabilities available to the general public.

Under a floor system, banks will hold larger reserve balances, but these will remain contained within the closed loop of the SAMOS system. The SARB will set interest rates to achieve its inflation target, and it is this interest rate, rather than the supply of central bank balances, that will affect prices. The floor system will simply be the means whereby the SARB gives effect to the interest rate decision of the Monetary Policy Committee (MPC).

Under the new framework, will the SARB still use the term 'repo rate'?

The new framework will include weekly repo auctions in which banks borrow against collateral and then repossess (repo) their pledged assets by repaying their loans with interest (with that interest rate being the repo or repossession rate). For this reason, it will still be appropriate to call the interest rate set by the MPC the 'repo rate'. Alternative terms could also be used (such as 'policy rate' or 'deposit rate'), but the term 'repo' remains accurate, and it has the further advantage of being familiar to stakeholders, so it will be retained.

Why use a tiered floor (or floor with quotas) as opposed to a pure floor?

In a pure floor, the central bank pays the policy rate on a bank deposit. In a floor system with tiers or quotas, a bank can earn the policy rate on deposits up to a fixed amount, but excess deposits then attract a punitive rate. For instance, if a bank has a quota of R10 billion and deposits R11 billion at the SARB, it will earn the policy rate on the first R10 billion, and the standing facility deposit rate (the policy rate less 100 basis points) on the remaining R1 billion.

This feature has two attractions.

First, it discourages banks from hoarding cash, prompting them to lend it on to other institutions when their own holdings approach their quota limits. In systems with super-abundant liquidity, for instance due to QE, pure floors work adequately as there is too much liquidity for any bank to suffer scarcity, even with hoarding. But the SARB is not proposing a liquidity injection on this scale and wants the available liquidity to be distributed between banks. In this sense, quotas will preserve a necessary degree of interbank market functioning.

Second, quotas will disincentivise banks from demanding additional quantities of bank reserves and thereby expand the SARB's balance sheet in an undesired way. Although the optimal size of a central bank balance sheet is difficult to establish, by introducing a new MPIF the SARB would prefer to retain control of its balance sheet, with quotas serving as a tool to help it expand the reserve supply as it sees fit.

The downsides of quotas are that they add complexity and can cause rates to trade slightly below the floor, as quota-constrained banks would have incentives to lend their excess reserves out below the policy rate to escape the penalty. To avoid these problems, the challenge for the SARB will be setting quotas at an appropriate rate so that banks are comfortable within the quota envelope and rates do not diverge from the policy rate in a material way. Banks will also be able to mitigate downward pressure on rates by using the averaging flexibility built into required cash reserves, with temporarily long banks placing excess funds in required reserves instead of offering them to the market below the repo rate.

Will banks be required to fill their quotas?

No. Unlike reserve requirements, quotas will represent an allowance rather than an obligation. Banks may choose to hold extra liquidity in their quotas, which they could source from repo auctions or from transactions in the market, but they would not be obliged to hold quota balances or fill their quotas. Banks may hold liquidity in excess of their quotas, but the excess liquidity would be remunerated at a punitive rate as a disincentive to hoard liquidity.

Is this tiered floor system intended as a temporary measure or a permanent one?

An immediate benefit of the proposed system is that it will solve problems created by the large liquidity expansion in South Africa that was prompted by the COVID-19 crisis. However, the SARB does not see this reform as a stop-gap measure to be replaced by a new system when the pandemic has passed. Rather, the floor framework is expected to remain in place for an extended period.

This system is expected to have permanent advantages in that it will be robust to future shocks, which are unknown but inevitable; it will be relatively simple; and it will help promote financial stability, by providing a larger supply of central bank balances.

These considerations have also informed plans by other leading central banks to maintain floor systems even when crisis conditions pass.[79]

In addition, the SARB is cognisant that framework reforms entail transition costs, mainly for stakeholders to learn about the new arrangements. It is therefore less disruptive to maintain frameworks for long periods of time, where possible, rather than make frequent systemic changes. (Note that the shortage system has been in use since 1998.)

[79] See for instance Andrew Hauser, 'Waiting for the exit: QT and the Bank of England's long-term balance sheet', 17 July 2019, available at https://www.bankofengland.co.uk/speech/2019/andrew-hauser-speech-hosted-by-the-afme-isda-icma-london

Annexure 3: New Zealand's tiered floor system

In 2006, the Reserve Bank of New Zealand (RBNZ) adopted a floor system for transmitting monetary policy, which replaced a more traditional midpoint corridor system.[80] In contrast with other major central banks, this adjustment preceded the global financial crisis and was not motivated by policy implementation challenges posed by asset purchase programmes (such as quantitative easing (QE)).[81] Rather, it had more to do with operating a system of real-time settlements effectively, without the central bank taking on undue credit risk, which is something that could be achieved if banks held larger settlement balances.

New Zealand started the shift to a cashed-up approach in late 2005, with a steady expansion of liquidity delivered mainly through foreign exchange (FX) swaps. This eventually raised the supply of settlement balances at the RBNZ overnight, from around NZ$20 million to approximately NZ$7 billion, in line with the RBNZ's projections.[82] The full operationalisation of the new system was then completed over a 12-week period, with the standing facilities being adjusted, in 5 basis point increments at 3-week intervals, until the deposit rate (the Official Cash Rate (OCR)) matched the policy rate. The lending rate ultimately settled at 50 basis points over the policy rate, maintaining the pre-existing 50 basis point corridor, but with the OCR now at the bottom of the corridor rather than its midpoint. This incremental approach was chosen over a 'big bang' reform to help ensure a smooth transition to the new system, with time for banks and the RBNZ to become familiar with the changes.

The RBNZ has continued to conduct open market operations under the new regime, using instruments also found in the South African Reserve Bank's (SARB) toolkit (including Reserve Bank bills, very short-term instruments similar to debentures, as well as FX swaps). These interventions have served both to inject liquidity to keep the

[80] On the previous system, see David Archer, Andy Brookes and Michael Reddell, 'Monetary policy implementation: changes to operating procedures', *RBNZ Bulletin*, March 1999, available at https://www.rbnz.govt.nz/-/media/ReserveBank/Files/Publications/Bulletins/1999/1999mar62-1archerbrookesreddell.pdf?revision=64a80d65-86cf-4471-90c4-60daa974d242

[81] RBNZ, 'Review of the Reserve Bank of New Zealand's liquidity management operations: a consultation paper', March 2006. https://www.rbnz.govt.nz/-/media/ReserveBank/Files/Markets-and-payments/Domestic-markets/2468835.pdf?la=en

[82] Previously, intraday usage had averaged NZ$4 billion. Balances rose subsequently, in the context of a global financial crisis, occasionally surpassing NZ$10 billion. They subsequently settled closer to NZ$7 billion again.

system cashed up, but also to drain liquidity, for instance to prevent government payments from expanding the money supply and risking excessive volatility in interest rates. While in a true floor system all excess reserves are drained automatically, the RBNZ has until recently aimed to keep the market permanently cashed up, but not oversupplied with liquidity. (This changed after March 2020, as discussed below.)

Unlike the SARB, the RBNZ does not hold weekly auctions to provide liquidity to the markets. Rather, markets have daily access to liquidity through the overnight reverse repo facility (ORRF), which is the upper bound of the RBNZ's corridor. This facility has generally been priced at 50 basis points above the OCR, although since February 2020 the penalty has been milder, at 25 basis points above the OCR.[83]

Since its inception, the largest reform to the system has been the introduction in August 2007 of a tiering system to cap banks' access to the deposit facility. This system was aimed at reinvigorating the interbank market and at deterring banks from treating central bank balances as an investment product, competing with Treasury bills, and instead using their RBNZ balances for settlement purposes only.[84] This meant banks could not earn the OCR on any quantity of deposits, with amounts beyond a given threshold being reimbursed at OCR less 100 basis points instead. Different banks have had different thresholds depending on their payment volumes, balance sheet sizes and similar factors.[85] Although this change encouraged interbank lending, as intended, it also contributed to interbank rates trading slightly below the cash rate, on average. In March 2020 this became a serious constraint, with the RBNZ wishing to conduct active balance sheet policies but reluctant to force rates below the OCR by pushing banks beyond their tiers. The tiering system was therefore removed

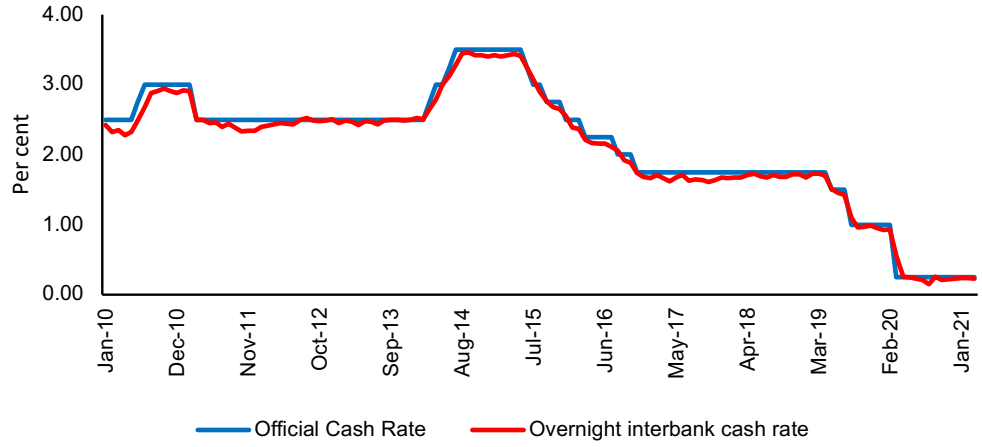
[83] RBNZ, 'Reserve Bank liquidity accommodation for a new payment system', February 2020. https://www.rbnz.govt.nz/markets-and-payments/domestic-markets/domestic-markets-media-releases/reserve-bank-liquidity-accommodation-for-new-payments-system. Although the change was initially billed as temporary, it remained in place at the time of writing (April 2021).

[84] Ian Nield, 'Evolution of the Reserve Bank's liquidity facilities', *RBNZ Bulletin,* Vol. 71, No. 4, December 2008, especially p 13. https://www.rbnz.govt.nz/-/media/ReserveBank/Files/Publications/Bulletins/2008/2008dec71-4nield.pdf

[85] Sandeep Parekh, 'How the Reserve Bank of New Zealand manages liquidity for monetary policy implementation', *RBNZ Bulletin*, Vol. 79, No. 9, May 2016, p 8. https://www.rbnz.govt.nz/-/media/ReserveBank/Files/Publications/Bulletins/2016/2016May79-9.pdf?revision=a974fe80-b43c-4daa-a36b-e229c1cbaf98

and New Zealand returned to a true floor system.[86] The quantity of settlement balances duly expanded, from approximately NZ$8 billion to NZ$30 billion − a shift the system was able to absorb without compromising monetary policy transmission.[87]

New Zealand interest rates



[86] RBNZ, 'Reserve Bank announces new facility and removal of credit tiers', 20 March 2020. https://www.rbnz.govt.nz/markets-and-payments/domestic-markets/domestic-markets-media-releases/reserve-bank-announces-new-facility-and-removal-of-credit-tiers

[87] Christian Hawkesby, 'COVID-19 and the Reserve Bank's balance sheet', 20 August 2020. https://www.rbnz.govt.nz/research-and-publications/speeches/2020/speech2020-08-20

Annexure 4: The Bank of England's floor system

Until March 2009, the Bank of England (BoE) conducted monetary policy using a midpoint corridor system. Banks were expected to achieve reserve targets, on average, over a period of either 28 or 35 days, depending on the date of the next Monetary Policy Committee meeting. Balances consistent with these targets (i.e. between 99% and 101% of the target) earned the policy rate.[88] Banks identified their own reserve needs, on a monthly basis, with a maximum but no minimum permissible level, and were then held to those self-chosen requirements. Standing facilities were offered at 100 basis points above and below Bank Rate, with the exception of the day before the close of the reserves averaging period, where the margin was only 25 basis points in either direction.[89] This variation encouraged the functioning of the interbank market throughout the month, without creating excess volatility in interest rates on the day banks had to satisfy their reserve targets. Open market operations were used to ensure the system as a whole was not excessively supplied with reserves, with liquidity being drained mainly through BoE bills (equivalent to debentures).

Following the global financial crisis, the BoE's quantitative easing programme left the system oversupplied with reserves. To prevent banks from being forced into the punitive standing deposit facility – that is, to prevent interest rates from being forced to the bottom of the corridor – the BoE shifted to a floor system. The standing lending facility remained in force, priced at 25 basis points higher than Bank Rate, while the deposit facility dropped away. With reserves already abundant, the BoE discontinued its repurchase (repo) auctions. Financial institutions nonetheless retained access to liquidity, on their own initiative, through longer-term repos and a discount window. The BoE has another facility it can make available at its own discretion for providing liquidity, at attractive rates, during periods of market stress. These instruments differ

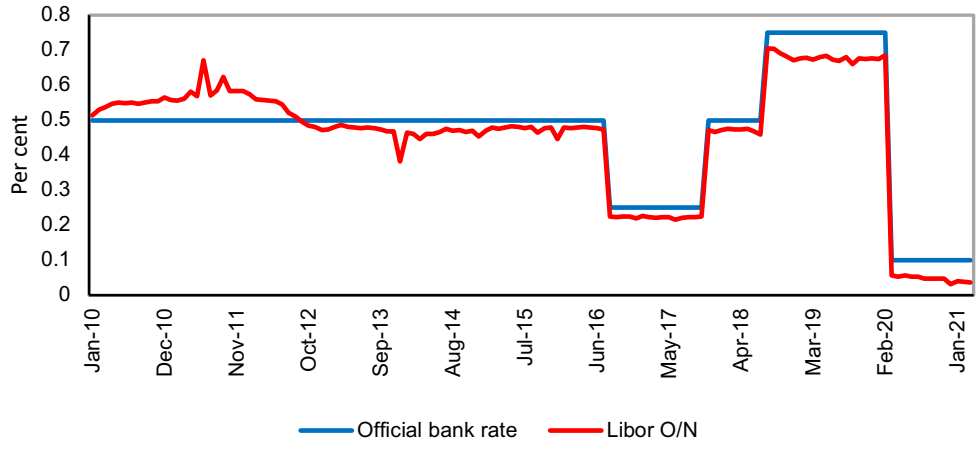
[88] Average excess or deficit positions, after 30 days, were charged at 200 basis points, either to borrow enough to satisfy the requirement or lend excess reserves. The penalty for missing the reserve requirement over 30 days was therefore significantly larger than for borrowing or lending from the BoE overnight. See https://www.bankofengland.co.uk/-/media/boe/files/markets/sterling-monetary-framework/operating-procedures.pdf

[89] BoE, 'The framework for the Bank of England's operations in the sterling money market', November 2006, p 21.. https://www.treasurers.org/ACTmedia/redbook0506.pdf

from the standing facility in that they are available throughout the day and provide funds for longer tenors than overnight.[90]

As long as interest rates are set to the zero lower bound, it is not difficult to achieve monetary policy transmission because market rates are unlikely to fall below zero. The test for these systems is whether short-term rates can be raised despite abundant liquidity. In the BoE's case, its Monetary Policy Committee raised rates in 2017 and 2018 successfully, despite the stock of reserves being over £600 billion at the time (or approximately 10 times the pre-crisis level).[91] The floor system therefore worked more or less as designed. It is, however, striking that market rates have often been below the Bank Rate, meaning it has not been a hard floor. The main explanation for this is that market rates such as the London Interbank Offered Rate (Libor) include trades between institutions without access to the BoE deposit facility.[92] The BoE's experience is an important reminder that frictions can allow interest rates to deviate marginally below floors.

United Kingdom



[90] BoE, 'The Bank of England's sterling monetary framework', June 2015. https://www.bankofengland.co.uk/-/media/boe/files/freedom-of-information/2016/sterling%20monetary%20framework%20june%202015.pdf. See part 2.

[91] The BoE had liabilities of £607 billion in 2018, compared with £62 billion in 2005 and £55.7 billion in 2004.

[92] David Bowman, Etienne Gagnon and Mike Leahy, 'Interest on excess reserves as a monetary policy instrument: the experience of foreign central banks', *Board of Governors of the Federal Reserve System, International Finance Discussion Papers No. 996,* March 2010, p 14. https://www.federalreserve.gov/pubs/ifdp/2010/996/ifdp996.pdf

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Abbreviations

BIS	Bank for International Settlements
BoE	Bank of England
COVID-19	coronavirus disease 2019
CPD	Corporation for Public Deposits
FX	foreign exchange
GDP	gross domestic product
IMF	International Monetary Fund
Jibar	Johannesburg Interbank Average Rate
Libor	London Interbank Offered Rate
LTRR	long-term reverse repo
MOID	Monetary Operations and Instruments Database (of the IMF)
MPC	Monetary Policy Committee
MPIF	monetary policy implementation framework
NTSDA	National Treasury Sterilisation Deposit Account
OCR	Official Cash Rate (of the RBNZ)
QE	quantitative easing
RBNZ	Reserve Bank of New Zealand
repo	repurchase (rate)
Sabor	South African Benchmark Overnight Rate
SAMOS	South African Multiple Option Settlement (system)
SARB	South African Reserve Bank
US	United States
ZASFR	South African Secured Overnight Financing Rate
ZARIBOR	South African Rand Interbank Overnight Rate
ZARONIA	South African Rand Overnight Index Average