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Monetary policy in South Africa, 2007–21

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Abstract: This paper reviews South Africa's monetary policy since 2007 and makes recommendations towards improving the inflation-targeting framework currently in place. Following a surge in inflation into double digits in 2007/08, the South African Reserve Bank managed to guide inflation in line with the 3–6 per cent target band. Estimates of South Africa's potential output underwent successive downward revisions. The resulting output gap misperceptions contributed to the tendency of inflation to be closer to the upper edge of the band in the 2010s. Our assessment is that the current definition of the target is not ambitious enough and reduces the benefits that inflation targeting could otherwise provide. An eventual point target of 3 per cent would better promote growth and protect the value of the currency, as mandated by the Republic's Constitution.

Key words: monetary policy, inflation targeting, output gap misperceptions, South Africa

JEL classification: E52, E58, E61

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1 Introduction

This paper reviews South Africa's experience with inflation targeting since 2007. Following its introduction in 2000, inflation targeting had a rocky start. As late as 2007/08, inflation surged into double digits. Since then, it has been a success story: South Africa's Reserve Bank has managed, through transparent communication and generally well-judged policy interest rate measures, to keep inflation within its 3–6 per cent target band most of the time, with only small and brief aberrations.

Now that the Reserve Bank has shown its ability to stabilize inflation and to anchor expectations, the question arises as to whether the current definition of the target is the most appropriate. Inflation and inflation expectations tended to be closer to the upper edge of the band during the 2010s. Estimates of South Africa's potential output underwent successive downward revisions during this period, with the resulting output gap misperceptions contributing to this tendency. Our assessment is that it would be better to target a point rather than a band, and that the point chosen should be closer to the lower edge of the current band. By hindering the solid anchoring of inflation expectations at a focal point, inflation targeting with a wide band significantly reduces the benefits that the inflation-targeting framework could otherwise provide.

There are arguments in favour of opting for a somewhat lower target than the midpoint of the current band. Inflation at 4.5 per cent is arguably still too high to really be thought of as 'price stability'. Aiming instead at 4 per cent would be consistent with what was planned early on in South Africa's inflation-targeting regime (the envisaged 3–5 per cent band that was announced for 2003/04 but abandoned).

It is likely that successfully targeting an inflation rate of just 3 per cent in the medium term would offer an even more stable monetary platform for growth. A credible announcement of the intention to move to such a target need not incur a 'sacrifice' in terms of a period of unemployment. Already reasonably transparent, the South African Reserve Bank's (SARB) communications could be made even more effective by some enhancements, for example by publishing summary minutes of monetary policy meetings and of the dialogue between the SARB and the National Treasury

Like other countries, South Africa seems to have had a decline in its neutral real interest rate, but with current estimates at about 2 per cent (compared with about zero for several advanced economies), this is still high enough to ensure that the lower bound problem would be sufficiently infrequent with an inflation target of 3 per cent per year.

But moving the inflation target for the SARB down to 3 per cent would require the fiscal authority to play its part, notably to avoid persistent high increases in administered prices.

Precision on the intended long-term inflation rate is important *inter alia* for borrowing costs. But monetary policy cannot eliminate the credit risk premium demanded by market participants of a heavily indebted sovereign with a relatively weak credit rating. Credit risk has increasingly been a stronger influence than inflation expectations on South African government bond yields, especially since 2019.

The global money market disruptions of March 2020 affected South Africa, with a notable spike in government bond yields. The SARB responded promptly and proportionately with a modest asset purchase programme that removed the yield spike and stabilized the market. There is little

scope in South Africa to use a greater quantity of asset purchases to support economic growth and ease fiscal constraints. An attempt to do so in a country with such a weak credit rating would be likely to be counterproductive.

Although legislation does not confer as much *de jure* independence on the SARB as has become common internationally, the *de facto* situation appears to be much better, and this is underpinned by an unambiguous broad statement of independence in the Constitution. It is not clear that legislative initiatives are currently needed to improve matters, and there is some risk that opening a debate on them when a satisfactory equilibrium has been achieved might prove to be counterproductive.

In order for the SARB to continue to deliver on its mandate, it will remain important for it to retain a good grasp of macroeconomic conditions. While the persistence of inflation at or around the upper edge of the band for several years, starting about a decade ago, may have partly reflected policy preferences, we find evidence that a contributory factor was the SARB's persistent belief that *potential* output was expanding more quickly than we now know it did. Such errors are inevitable in the process of monetary policy formulation, but they do highlight the importance of retaining a good grasp of macroeconomic conditions and the value of enhanced robustness analysis. Macro-econometric models such as the SARB's Quarterly Projection Model (QPM) can be useful in this task, but their limitations mean that their projections and implied policy path should not be given undue prominence in communication: instead, SARB communication should highlight the role of non-model-based judgement in policy choice.

The remainder of the paper explores these issues in greater detail, beginning in Section 2 with an overview of how policy was used to steer inflation relative to its target. Section 3 looks at how the policy trade-offs were assessed, with a particular focus on misperceptions about the output gap, while Section 4 looks at how the QPM model used by the SARB is structured. Section 5 describes the anchoring of inflation expectations, before a discussion of whether a point target would be better than the current band (Section 6) and whether the point target should be lower than 4.5 per cent (Section 7). Section 8 examines the impact of monetary policy on the government's borrowing costs and Section 9 discusses the purchase of government bonds. The degree of transparency in the SARB's policy approach is assessed in Section 10, while Section 11 discusses governance issues, and in particular the relationship with the National Treasury and the parliament.

2 Delivering on the inflation target

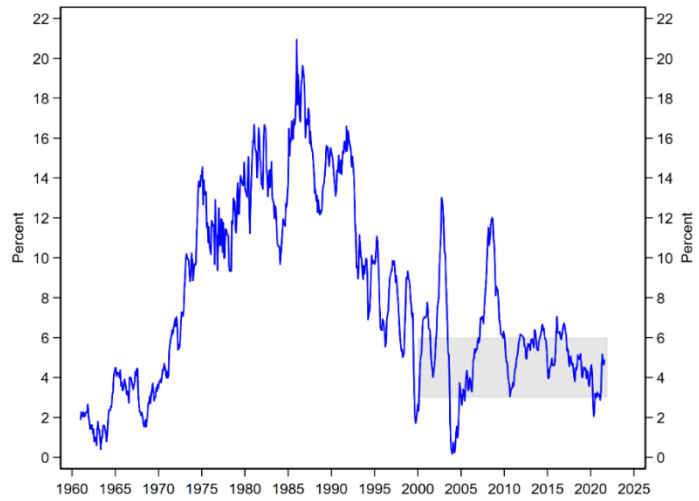
According to the Constitution, the SARB's primary objective is to 'protect the value of the currency in the interest of balanced and sustainable economic growth in the Republic' (Republic of South Africa 1996: section 223). A monetary policy strategy based on inflation targeting is well suited to achieving this objective.

By securing low and stable inflation over time, with an inflation goal close to that of major trading partners, the SARB can protect the value of the currency, both in terms of the domestic price level and in relation to foreign currencies. And by ensuring that inflation expectations remain well anchored, consistent with low and stable inflation, the SARB can better fulfil its mandate in two additional dimensions. By providing an environment of monetary stability, it can foster balanced and sustainable growth over time; and by maintaining a high degree of credibility to defend price stability, it can forcefully counteract adverse shocks and more effectively dampen business cycle fluctuations.

2.1 The path of inflation

Though the two decades of inflation targeting in South Africa have seen much lower inflation on average than the prior decades (Figure 1), inflation targeting in the country had a somewhat rocky start in the early 2000s.[1] It took more than a decade of inflation targeting to stabilize inflation at close to the target band of 3–6 per cent. Indeed, in the period under review (2007–21) average Consumer Price Index (CPI) inflation was 5.6 per cent—less than 100 basis points lower than the previous 15 years. In considering the degree to which the value of the rand (ZAR) has been protected, it may be noted that inflation has systematically exceeded that of South Africa's trading partners by some margin.

Figure 1: Inflation in South Africa, 1960–2021



Source: authors' illustration based on SARB data.

The 3–6 per cent per year band for inflation proved hard to achieve consistently, with a large early surge into double digits followed by a brief period of zero inflation. This early experience led the authorities to abandon plans to narrow and lower the target band.

But since a second surge into double digits in 2007/08 was brought under control by the end of 2009, the Reserve Bank has managed to avoid exceeding the upper edge of the band by more than one percentage point.

From mid-2017, helped by an appreciation of the rand (reversing the depreciation trend of the previous half-decade), inflation slowed, with the monthly figures averaging 4.5 per cent in the two years before the pandemic broke out.

The pandemic brought inflation briefly down to about 2 per cent—the first time it had gone below the band. There has been a subsequent bounce-back during 2021, and the future path is difficult to forecast for the short term, given the pandemic disruption and the whiplash exchange rate developments since early 2020.

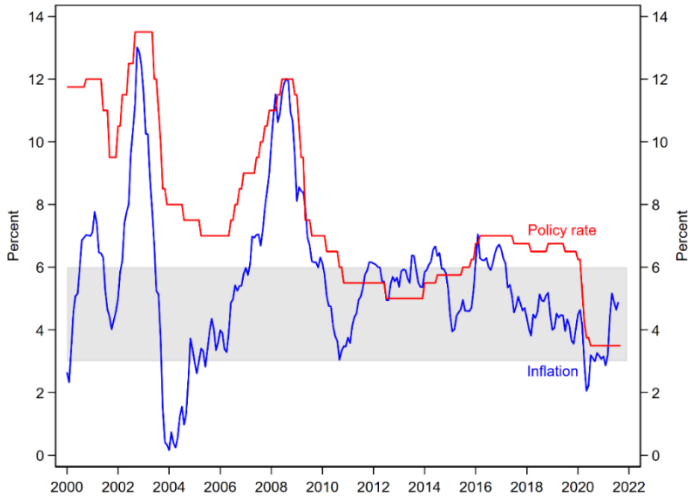
[1] In looking at the CPI inflation plots in Figures 1 and 2 it should be borne in mind that the 3–6 per cent target before 2009 referred to CPIX and not CPI.

2.2 Policy tools

The primary technique used by central banks to control inflation is to influence actual and expected interest rate movements, thereby influencing aggregate demand and, through that, actual and expected inflation. The main tool used by the SARB is the rate for its repo operations.

In the period under review, there have been two main policy rate cycles (Figure 2). In the first, running from 2006 to 2010—when inflation drivers included the spillover from an international oil price cycle and a whiplash weakening of the rand—the SARB was not vigorous enough and allowed inflation to spike into double digits. In the second cycle, 2014–20, the SARB was again reactive and repo was not raised high enough to bring inflation decisively down from the top of the band before 2017.

Figure 2: CPI inflation and the repo rate, 2000–21



Source: authors' illustration based on SARB data.

Cycle A

The first tightening of repo (from 7 to 7.5 per cent) began in June 2006, a month in which a jump in annual inflation from 3.9 to 4.9 per cent was recorded. This seems to have been a surprise to the SARB, which had quite recently published an inflation fan chart that had projected only a moderate and transitory rise in inflation;[2] indeed this fan chart attached a less than 10 per cent probability to inflation exceeding the bank over the following two years. Indeed, the fan chart published in in the *Monetary Policy Review* (MPR) a year later (May 2007) still attached very low probability to inflation above 7 per cent. Nevertheless, foreseeing some further rise in inflation, albeit underestimating its scale, the SARB continued to tighten repo in steps of 50 basis points (bp) until it reached 12 per cent in June 2008. By that stage inflation was over 13 per cent, suggesting that the tightening had not been at all fast enough. This seems to have been attributable more to weakness in forecasting than to reluctance to take more decisive steps, given that even as

[2] The fan chart presented in Figure 20 of the May 2006 MPR (SARB n.d.). At the time, the SARB targeted the CPIX index of inflation, which varied somewhat from the CPI index targeted from 2009 on. Nonetheless, the SARB tracked both indexes and their evolution and surprises discussed in the text were broadly similar.

late as May 2008, the SARB's fan chart did not envisage inflation reaching 11 per cent, let alone the 13 per cent that was realized.

As inflation began to slow in late 2008, and in light of the significant deterioration of the global economic outlook due to the global financial crisis (GFC), the repo rate was reduced in several large steps, coming back to 7.5 per cent in May 2009, by which time inflation was down to 8 per cent. In fact, inflation continued to fall in the following months, almost reaching the *bottom* of the band in September 2010, despite further reductions in the repo rate, which reached 6 per cent in that month. Once again, inflation moved beyond where the fan charts had foreseen: the May 2009 fan chart attached less than a 10 per cent probability to inflation falling below the bottom of the band. Thus, on the way down also it seems that the policy rate was not lowered fast enough.

This first cycle thus suggested insufficient speed and scale of policy moves both on the way up and on the way down.

(As for the real economy, following its typical behaviour in lagging the business cycle, the employment rate, which had risen to about 46 per cent during 2008, fell rather sharply even as monetary policy was being eased during 2009, dipping below 42 per cent for most of 2010/11. The deficit on the current account of the balance of payments was at its highest level of about 7 per cent of GDP in 2007 and 2008—a further clear indication of overheating in those years; this was followed by a contraction to about 2 per cent in 2010/11.)

Cycle B

By the time repo bottomed out the first cycle at 5 per cent in July 2012, inflation had bounced back, exceeding the top of the band on several occasions. It is noteworthy that despite the May 2011 fan chart forecast of inflation hovering close to the top of the band, repo was not increased, suggesting that the SARB was not concerned at that point to bring inflation closer to the middle of the band. Indeed, when the May 2012 fan chart projected a gradual decline towards the middle of the band, it was followed by a lowering of the repo rate—the final one in this cycle—perhaps suggesting that the middle of the band was seen as too low a target.[3]

The prospect of persistent excesses prompted the start of the second cycle in January 2014. By May of that year the fan chart projected inflation averaging above the top of the band over the following year, with a probability of about two in five that this excess would continue to the end of the 30-month projection horizon. This cycle was less pronounced, with repo reaching 7 per cent in early 2016. Nevertheless, inflation remained above the top of the band for almost all of 2016 and the first quarter of 2017.

(Movements in employment were less pronounced in the second cycle: despite the tightening, the employment rate increased to about 44 per cent at the end of 2015, before trending down to its pre-pandemic level of about 42 per cent. The balance-of-payments deficit also experienced a more moderate cycle, peaking at less than 6 per cent of GDP in 2013.)

In the second cycle the SARB was again reactive in its monetary policy actions, though this time its actions were sufficient to prevent inflation from exceeding the top of the band by more than 0.8 percentage points.

[3] Though we do not know if the May 2012 fan chart already envisaged the July 2012 lowering of repo.

From the first quarter of 2017 until the pandemic, inflation remained within 1 per cent of the middle of the band, with an average of 4.52 per cent. This was despite a slightly easing trend in the nominal policy rate (and with one 25-bp reversal) to 6.25 per cent. The strengthening of the rand from the third quarter of 2016, after a prolonged period of relatively steady depreciation, is also likely to have been an important driver of the more favourable inflation outcome (Figure 3). Indeed, with the nominal repo rate still close to its second-cycle peak, lower inflation began to drive higher real interest rates.[4]

Figure 3: Effective (trade-weighted) exchange rate of the South African rand, 2000–21

Source: authors' illustration based on Bank for International Settlements (BIS) data.

The second major international macroeconomic spillover relates to the COVID-19 pandemic crisis. The SARB adopted an energetic response to this rather different type of crisis. The repo rate was reduced sharply in three steps between March and May 2020 to 3.75 per cent, followed by a further 25 bp in July, bringing it to a historic low level. In addition, to stabilize financial markets, government bonds were purchased by the SARB (discussed in Section 8 below). These measures were prompt and proportionate, though of course they were not able to prevent inflation falling below the band. (Employment also fell sharply, and the current account of the balance of payments went into surplus.) The scale of the *sui generis* shock was too large to be neutralized by monetary policy: the SARB's response was prompt and proportionate.

3 Perceived policy trade-offs and output gap misperceptions

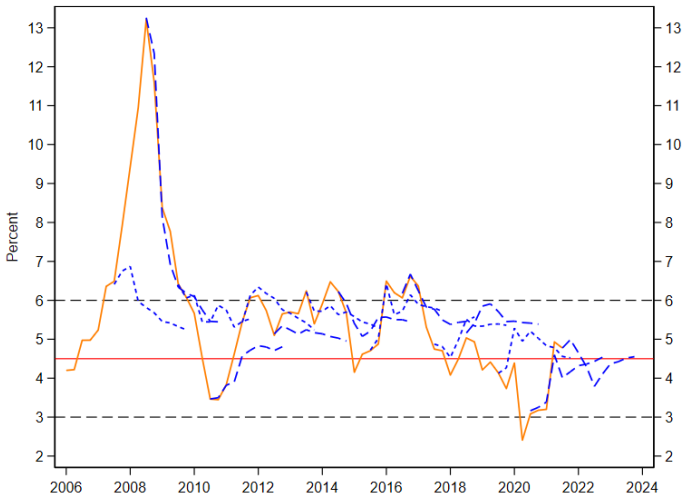
As we have seen, after the 2008/09 inflation surge, annual inflation in South Africa remained within or close to the target band. But most of the time was spent close to the top of the band, with just three short episodes when inflation dipped below the midpoint. What explains this outcome?

While there may have been a policy preference for staying close to the top of the band for much of the time, such a preference was not made public. And, in any case, in a dynamic economy that

[4] Pass-through of exchange rate depreciation to domestic prices is still relevant, albeit smaller than before the introduction of inflation targeting (Kabundi and Mlachila 2018). Indeed, movements in the rand often act as shock absorbers (Soobyah and Steenkamp 2019). See also Loewald (2021).

is subjected to shocks over time, optimal policy will aim to guide inflation closer to the midpoint of a band even if the inflation band is interpreted as a zone of indifference (Orphanides and Wieland 2000). Indeed, the SARB's inflation projections consistently showed inflation at well below 6 per cent for 2–2.5 years ahead, though until 2019 they did not show projected inflation closing in on the midpoint of 4.5 per cent before the end of the projection horizon (Figure 4).

Figure 4: The SARB's inflation projections, 2007–21



Note: inflation over four quarters; orange line is historical inflation data as available in the October 2021 MPR; blue dashed lines, one per year from 2007 to 2021, show the SARB's inflation projection as published in the second MPR in each year; projections extend to the fourth quarter two years after the year of publication.

Source: authors' illustration based on SARB (n.d.).

The reluctance to push inflation more promptly and consistently towards the midpoint of the band is likely instead to have reflected the SARB's belief throughout the period 2010–19 that the economy was underperforming relative to its sustainable potential, and by a considerable margin. Such conditions could have supported arguments for desisting from rate increases at least as long as inflation remained close to the band.

Dealing with perceived short-term trade-offs between economic weakness and price stability is a core monetary policy challenge. One way to assess the SARB's monetary policy during this period is to examine how it dealt with perceived deviations from economic stability and price stability over time—inflation and output 'gaps'. Figure 5 presents a visual summary comparison of the relative importance of these two factors for SARB policy until 2019.[5] The blue line in panel 5a shows inflation analysts' one-year-ahead expectations of deviations from the 4.5 per cent midpoint of the target band—an inflation 'gap', $(\pi_t^e - \pi^*)$. The black line in panel 5b shows the SARB's real-time estimate of the output gap, y_t, defined as the percentage difference between GDP in each quarter and the SARB's estimate of potential GDP for that quarter. In each panel, the indicators of inflation and economic activity are compared with a proxy for the stance of monetary policy, a real interest rate 'gap', $(r_t - r^*)$, shown by the red line. The proxy shown is a real policy rate minus 2.5 per cent, which represents an estimate of the long-run neutral real rate.[6] The real

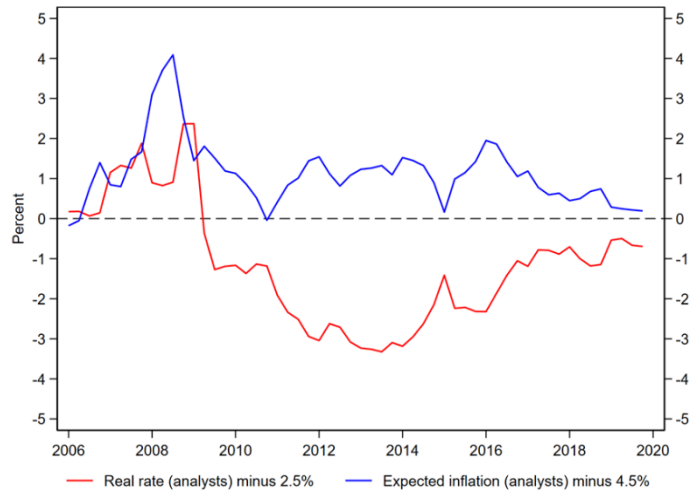
[5] We discuss the SARB's policy response during the COVID-19 pandemic later on.

[6] This is the estimate embedded in the SARB's QPM, (Botha et al. 2017). The 'gaps' shown in the figure are related to the concepts of the gaps in the QPM as discussed in the next section.

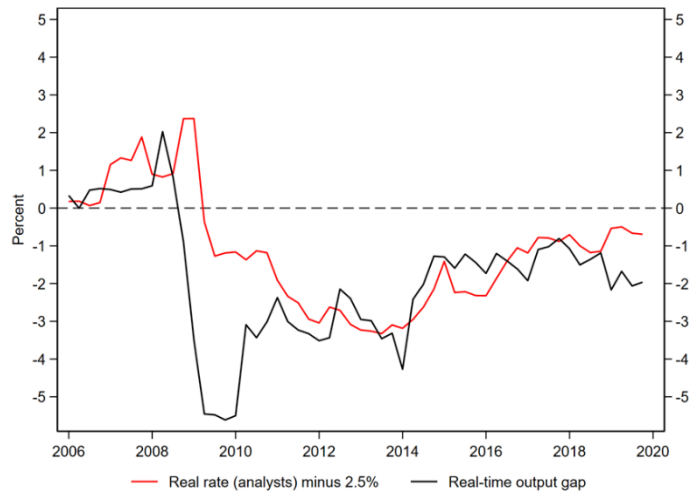
policy rate in this figure is constructed by subtracting the analysts' one-year-ahead inflation expectations from the SARB's policy rate.

Figure 5: Monetary policy—what explains the real rate?

5a: Real rate and inflation expectations



5b: Real rate and output gap



Note: inflation expectations (panel 5a) reflect analysts' one-year-ahead expectations from the Bureau for Economic Research (BER); output gap (panel 5b) reflects the SARB's real-time estimates; the real policy rate (both panels) is the policy rate during the quarter minus the inflation analysts' one-year-ahead expectations from the BER survey.

Source: authors' illustration based on SARB (n.d.) and BER data.

Judging by this proxy, monetary policy was persistently accommodative from 2009 to 2019, despite inflation expectations systematically exceeding 4.5 per cent (panel 5a). Had monetary policy focused on guiding inflation towards the midpoint of the band, it would have been tighter. A failure to predict the degree to which the fiscal deficit would overshoot its target may have contributed. But for most of this period, the degree of accommodation looks as if it was tracing the path of real-time estimates of the output gap (panel 5b).

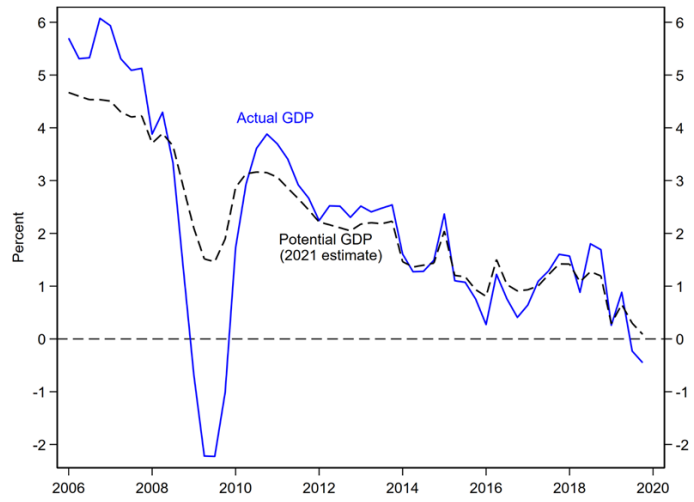
While a monetary policy approach that shows such responsiveness to real-time perceptions of the output gap may be reasonable if the output gap can be measured with confidence, such an approach may yield undesirable outcomes when the output gap is prone to real-time mismeasurement. In particular, if the central bank is systematically over-optimistic regarding its estimates of potential output and the output gap, responding strongly to the mismeasured output gap will inadvertently provide excessive policy accommodation, guide inflation above its desired level, and potentially induce undesirable economic instability rather than dampen business cycle fluctuations.

Unfortunately, the SARB's experience since the GFC suggests such a pattern of systematic mismeasurement of the output gap. It should be noted that the observed pattern of mismeasurement is neither uncommon nor unusual: it mainly reflects the largely unanticipated secular decline of real GDP growth in South Africa since the GFC. As can be seen in panel 6a of Figure 6, actual GDP has trended downwards since 2007 from over 5 per cent in 2007 to below 1 per cent in 2009. Current estimates of historical potential GDP growth reflect a similar decline. But the decline in actual GDP growth has only gradually come to be understood as reflecting a decline in potential GDP growth during this period. Panel 6b shows the SARB's real-time estimates and projections of potential GDP growth available in the second MPR of each odd-numbered year from 2007 to 2019.[7] Substantial one-sided revisions persisted for over a decade.

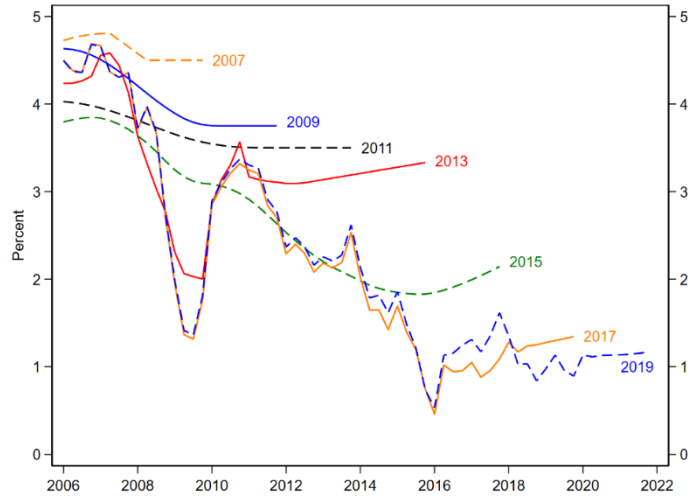
[7] The figure focuses on vintages every other year for clarity. The pattern of mismeasurement is similar if even years are also considered.

Figure 6: Actual and potential GDP growth estimates

6a: Actual and potential growth, 2021



6b: Evolution of potential growth, 2007--19



Note: growth over four quarters; vintages of potential output growth estimates correspond to projections published in second MPR of year shown; panel 6b includes projections extending two years beyond the fourth quarter of the year of the vintage shown.

Source: authors' illustration based on SARB data.

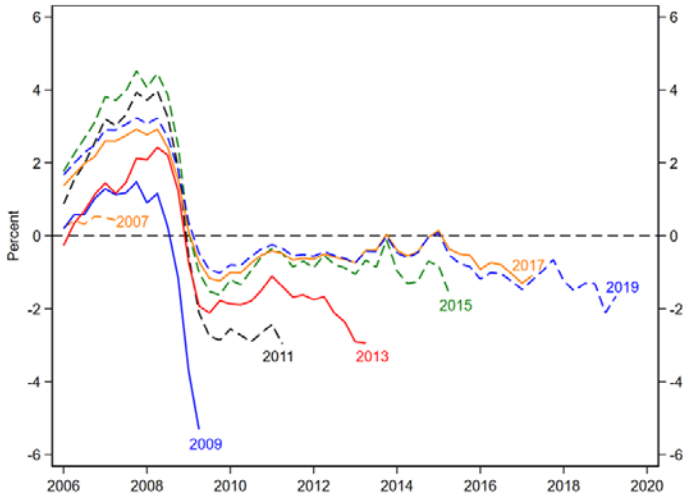
Over-optimistic assessments of potential output contributed to sizeable misperceptions in real-time output gap estimates. Figure 6 shows the evolution of output gap estimates (panel 6a) and a summary comparison of the real-time output gap estimates (previously shown in Figure 5) with the historical estimates of the output gap as available in the October 2021 MPR.

According to the most recent estimates, while there was indeed a negative output gap in 2009/10, this had more or less closed by 2012. We can see how the SARB's output gap estimates evolved in Figure 7. Each vintage brought estimated historical output gaps higher but interpreted recent events as having widened the output gap again. For example, although the 2015 vintage estimated that the output gap had been about zero in 2013, it suggested that a negative output gap of more than 1 per cent had opened up again since. In effect, the SARB persisted in its belief that potential output was expanding more quickly than it was (Figure 6, panel 6b). Faced with these output gap

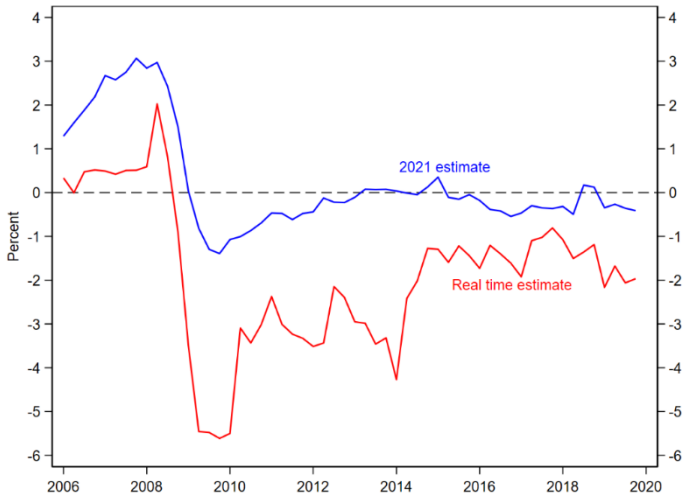
estimates, it is perhaps understandable that the SARB refrained from raising the policy rate more aggressively—instead doing just enough to keep inflation close to the top of the band. Specifically, the two rate increases in early 2016 effectively signalled the SARB's commitment to the band and were likely important in choking off a further round of price increases.

Figure 7: Output gap misperceptions

7a: Evolution of output gap estimates



7b: Real-time vs 2021 estimates



Note: vintages of output gap estimates (panel 6a) correspond to projections published in second MPR of year shown; real-time estimates (panel 6b) show estimate available for a quarter at that quarter.

Source: authors' illustration based on SARB data.

The degree to which real-time output gap mismeasurement leads to policy errors and a bias in inflation outcomes depends not only on the size of the misperceptions but also on the implied

policy rule consistent with a central bank's strategy. We can study this more closely with an interest rate policy rule:[8]

$$r_t - r_t^* = \theta_\pi(\pi_t^e - \pi^*) + \theta_y y_t$$

$$r_t = i_t - \pi_t^e$$

In the equations above, i_t is the policy rate in quarter t while y_t, $(\pi_t^e - \pi^*)$, and $(r_t - r_t^*)$ denote the output gap, inflation gap, and real interest rate gap concepts, respectively, similarly to what was shown in Figure 5.[9] The response coefficients, θ_π and θ_y, summarize how vigorous the response of monetary policy is to inflation and output deviations from their desired values. The larger the responsiveness to the output gap, θ_y, the greater the policy error introduced into the setting of monetary policy as a result of misperceptions of the output gap. The size of the resulting bias in inflation depends also on the responsiveness to inflation, θ_π. The more responsive policy is to the inflation gap, the smaller the resulting bias in inflation outcomes as a result of persistent output gap misperceptions.[10]

Figure 8 illustrates how different the setting of interest rate policy rate would have been if the current estimates of the output gap were available to policymakers in real time, and under the assumption that policy over this period has been responding to the output gap with the response coefficient $\theta_y = 0.54$.[11] The suggested differences between the actual and corrected policy settings are substantial. For example, over the 2012–16 period, while the historical real interest rate gap was consistently negative, suggesting accommodative policy in every quarter, it would have instead been restrictive for much of that time had policy been calibrated with the most recent estimates of the historical output gap.

[8] This is an example of a two-parameter Taylor-type policy rule. The classic Taylor rule formulation assumes that both response coefficients, θ_π and θ_y, take the value 0.5. See Orphanides (2003) for a review of such rules and their sensitivity to misperceptions of the nature discussed here.

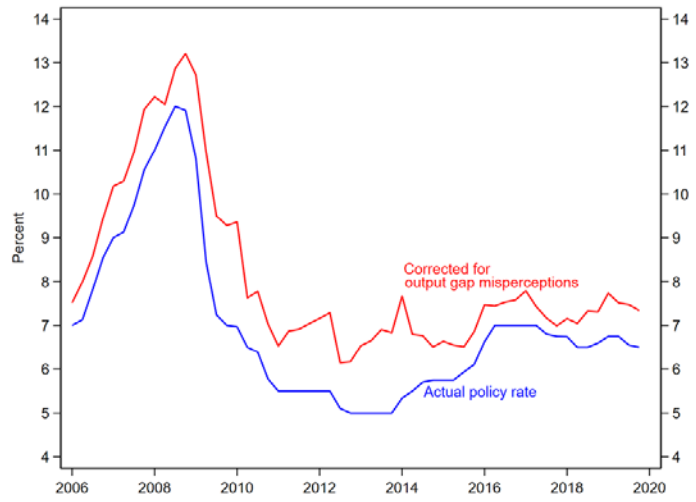
[9] In the figure we assume, for simplicity, a constant value for the neutral real rate of interest, but in more complex analysis (such as in the SARB's QPM model that we discuss in the next section) the neutral rate of interest may vary over time.

[10] If the response coefficients, θ_π and θ_y equal 0.5, as in the classic Taylor rule, each percentage point of a persistent mismeasurement in the output gap leads to one percentage point bias in inflation.

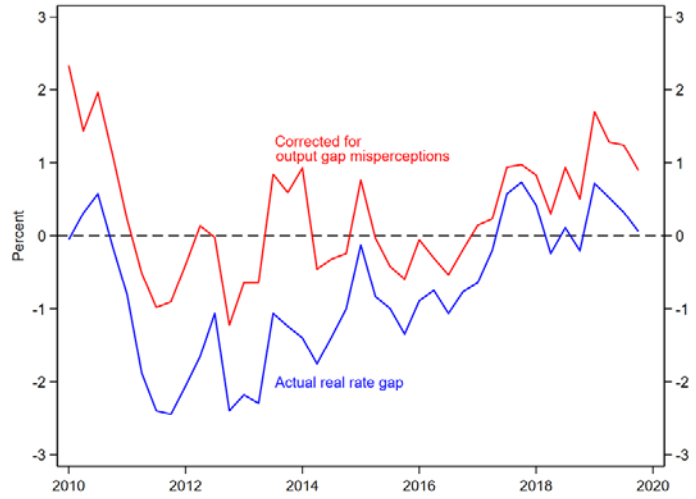
[11] This is equivalent to the responsiveness of the interest rate rule to the output gap embedded in the SARB's QPM, abstracting from the partial adjustment also embedded in the SARB's model.

Figure 8: Policy setting and output gap misperceptions

8a: Policy rate



8b: Real interest rate gap



Note: corrected interest rate is the actual rate plus the output gap misperception multiplied by 0.54 (the output gap coefficient in the QPM Taylor rule); real rate gap (panel 8b) is the QPM concept with time-varying neutral rate.

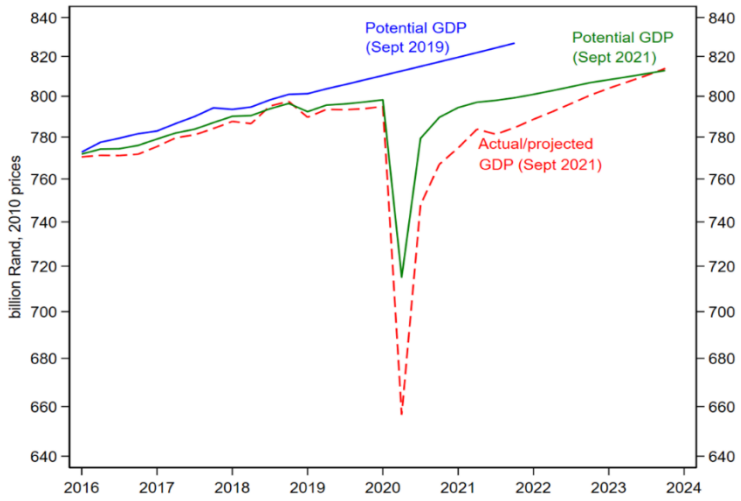
Source: authors' illustration based on SARB data.

In other words, had the SARB decision-makers known in 2012–16 that the output gap was close to zero, as current estimates suggest, they might well have raised interest rates quite a bit more (Figure 7, panel 7b). Still, while inflation stayed close to the top of the band, control over inflation was not perilously lost. Market participants continued to believe that medium-term inflation would remain close to the top of the target band, and indeed they were prepared to gradually adjust their inflation expectations down fairly soon after actual inflation began to fall.

More recently, the SARB has adopted a methodology that, overall, produces historical estimates of the output gap that are smaller in magnitude by apportioning a greater fraction of actual GDP

changes to changes in potential GDP.[12] A dramatic illustration of the consequences of this methodological change can be seen in the revisions of potential GDP since 2019 (Figure 9). This particular source of error has thus become less problematic than it was in the decade following the GFC.

Figure 9: GDP and potential projections before and during pandemic



Note: comparison of potential GDP estimates as published in the October 2019 MPR with potential and actual GDP in the October 2021 MPR; all estimates are in 2010 prices.

Source: authors' illustration based on SARB (n.d.).

4 Modelling the economy: the QPM and its four gaps

Successful implementation of the inflation-targeting approach to monetary policy starts with the communication of a clear inflation goal but also requires additional elements:

- a forward-looking policy orientation characterized by vigilant monitoring of the outlook for inflation and inflation expectations;
- clear communication of the central bank's policy strategy—the explicit or implicit reaction function that the public can expect the central bank to follow in response to changes in the outlook of the economy;
- a credible commitment to delivering the inflation goal over the medium term.

Monitoring of inflation expectations can benefit from suitable financial instruments, such as inflation swaps and break-even inflation rates implicit in bond markets as well as surveys of expectations. Both of these types of indicators are available in South Africa and have served as inputs to the policy process since inflation targeting was adopted two decades ago.

A forward-looking policy orientation can benefit from detailed policy analysis and economic projections. To this end, and similarly to practices at other central banks, the SARB has employed macro-econometric models. Models can be useful in the process of generating economic projections and as a communication tool—to explain the central bank's assessment of the outlook,

[12] See box 6 in the October 2017 MPR and box 7 in the October 2020 MPR (SARB n.d.).

associated risks, and its policy reaction function. The SARB has employed models and published inflation projections starting with the publication of the first MPR in March 2001. Since then, and increasingly over time, the SARB has published additional information, including considerable detail about the models and assumptions underlying its projections.

Consistent with standard practice, the SARB's models have been continuously reviewed and adjusted. While multiple models typically inform policy simultaneously, one model may have a more prominent role. Since 2017 the SARB's QPM has been the one more prominently used models for projections and policy communication. The model was introduced in the October 2017 MPR (box 1), with a more detailed description provided by Botha et al. (2017).[13]

Although the QPM model gained prominence at the SARB only in 2017, it had been under development at least since 2007 and had undergone revisions in between (De Jager 2007; De Jager et al. 2015). The model shares commonalities with QPMs developed at other central banks practising inflation targeting, starting with the Bank of Canada's QPM model, which was originally introduced in 1994 (Poloz et al. 1994).

The QPM is a so-called 'gap' model and can be described as a system of two distinct but interconnected formal models: first, a model describing 'steady-state' concepts of the economy, examining how they relate to each other while abstracting from cyclical dynamics; second, a model describing the cyclical dynamics of the economy, fluctuating around the more slowly evolving steady states.

Four key variables whose steady states are modelled over time are (i) inflation, (ii) potential GDP, (iii) the equilibrium real exchange rate, and (iv) the neutral real rate of interest. It should be noted that with the exception of the inflation rate—which in an inflation-targeting framework should correspond to the central bank's stated inflation goal—the remaining variables are in fact unobservable and require estimation based on auxiliary models.

Assuming that the steady state values of the key variables are known, the QPM can be described as characterizing the dynamic evolution of 'gaps' of the key variables from their steady state values. The four main 'gaps' are thus (i) inflation deviation from the inflation goal, (ii) the output gap, (iii) the real exchange rate gap, and (iv) the real interest rate gap.

An advantage of this structure is its relative simplicity and internal consistency. The cyclical properties of the economy incorporate dynamics due to the endogenous adjustment of expectations. Model-consistent expectations can be assumed, accounting for the effects of the anticipated monetary policy reaction to the evolution of the economy. As a consequence, the policy rule that describes the central bank's strategy becomes central to the projection of inflation, the output gap, and other variables.

By construction, under the assumption that the monetary policy rule satisfies basic stability properties, the four key gaps of the model will be projected to converge to zero within a few years, whatever the initial state of the economy.

An example of this feature of the projections is shown in Figure 10. The figure presents the recent history and the projected value for the four gaps corresponding to the projections published in the October 2021 MPR. As can be seen, all four gaps effectively close by the end of the projection

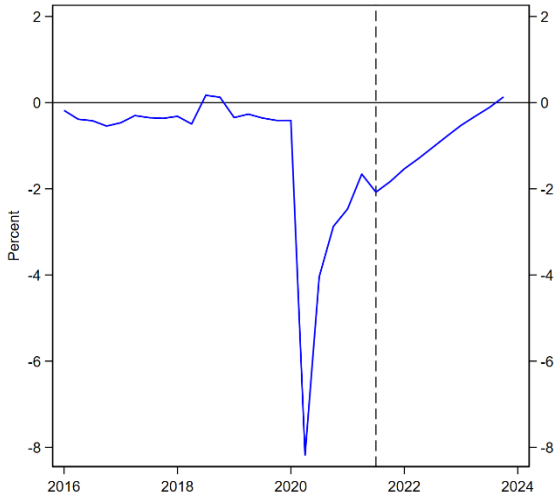
[13] Earlier, the SARB had relied on the Core model (Smal et al. 2007). De Jager and SARB (2017) provide a comparison of the two models.

horizon in 2023 Q4. Thus, in this projection, by 2023 Q4, inflation would be near 4.5 per cent, actual GDP would be about equal to potential GDP, the real exchange rate would be at equilibrium, and the real interest rate would be converging to the neutral real rate, which for 2023 Q4 is estimated to equal 2.36 per cent. Consequently, according to this projection, the repo rate by 2023 Q4 would be converging to the nominal neutral rate estimated around 6.8 per cent.

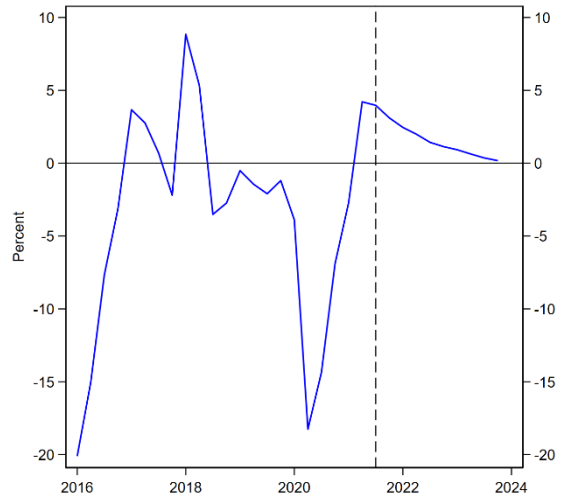
Figure 10: Four gaps

10a: Inflation gap

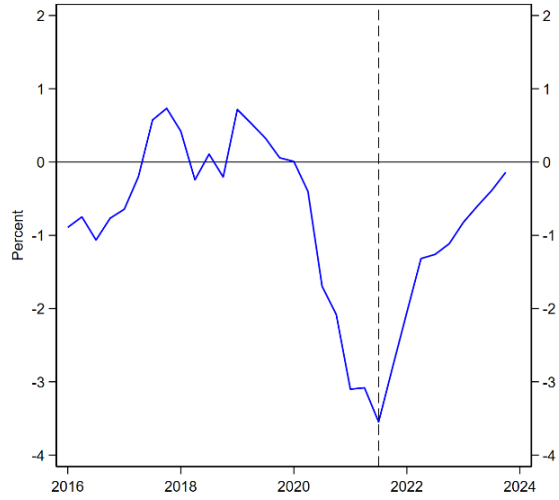
10b: Output gap



10c: Real effective exchange rate gap



10d: Real interest rate gap



Note: data and projection presented with the October 2021 MPR; vertical line in 2021 Q3 marks date of projection (September 2021); in panel 10c, a negative real effective exchange rate gap indicates undervaluation.

Source: authors' illustration based on SARB (n.d.).

Each policy projection is associated with a corresponding repo rate path that is implied by the projection and is prominently communicated by the SARB. This policy path is consistent with the monetary policy rule embedded in the SARB's QPM, which, as already noted, is central for the projection of inflation, and other variables.

The policy rule embedded in the QPM takes the form of a three-parameter Taylor rule:[14]

$$i_t = 0.79i_{t-1} + (1 - 0.79)\{i_t^* + 1.57(\pi_t^e - \pi^*) + 0.54y_t\}$$

where i^* is the nominal neutral rate, defined as $i_t^* = r_t^* + \pi^*$. With the announcement of the SARB's QPM model in the October 2017 MPR, the SARB communicated that, for forecasting purposes, the Monetary Policy Committee (MPC) of the SARB had chosen to use the 4.5 per cent midpoint of the target band as the point inflation target in the rule. Thus, in the QPM rule, the inflation goal is $\pi^* = 4.5$. The QPM's policy rule is a generalization of the classic Taylor rule, allowing for some degree of inertia in the setting of the (nominal) policy rate, consistent with actual practice across central banks. The specific parameterization employed in the model is in line with similar rules employed by other central banks. What is less clear is whether this rule is meant to describe the SARB's policy over some specific recent period or whether it is meant to describe in some way what the MPC might believe would be a useful characterization of its implicit policy rule.

This suggests an apparent incongruity in the SARB's policy communication. While the SARB prominently communicates the policy path derived from the QPM policy rule and the associated projections, and highlights the role of the projections and the policy path in the policy process, it simultaneously distances both the projections and policy path from the MPC.[15]

An alternative could be considered that would increase the usefulness of the current communication practice. The policy rule embedded in the QPM could be considered as one of the key 'assumptions' provided to SARB staff by the MPC to underpin the projection. While such a policy rule need not be a commitment for the exact setting of policy, it would present a more useful benchmark for policy analysis and would provide the MPC with more directly relevant input to the policy process.

Another potential trouble spot relating to QPM relates to one of the model's key strengths—its simplicity due to its focus on gaps. While this apparent simplicity is appealing, focusing on gaps obscures one of the most critical sources of uncertainty relating to policy and the associated economic projections—the uncertainty about the slowly evolving steady states of the key variables in the background.

Just how certain can the SARB be about its estimates of various 'stars': potential output, the neutral real interest rate, the equilibrium real exchange rate?

We have already highlighted the problems associated with estimates of potential output and the output gap in setting policy. Qualitatively similar problems arise when considering the neutral real rate of interest and the equilibrium real effective exchange rate. Indeed, the methodology employed by the SARB for estimating the neutral real interest rate for South Africa combines estimates of the neutral real interest rate in advanced economies with the SARB's estimates of the equilibrium real effective exchange rate, based on separate auxiliary models. This methodology likely results in

[14] In the SARB's formulation of this rule, expected inflation represents a moving average of inflation forecasts over three consecutive quarters, centred four quarters ahead.

[15] The SARB is transparent about this. For example, footnote 2 in box 2 of the October 2021 MPR states: 'The QPM forecast is generated by staff, and not by the MPC. It is prepared by staff and is delivered to the MPC as a final product. The MPC does not participate in the forecast process, except for approving the assumptions that underpin the forecast' (SARB n.d.). The difficulty with this explanation is that ordinarily the most important 'assumption' one might expect would be necessary to underpin the forecast would be the MPC's policy intentions.

even greater overall uncertainty about South Africa's neutral real rate relative to the already high degree of uncertainty associated with estimates of the neutral real interest rate in advanced economies.

Over the past several years, the SARB has repeatedly acknowledged the uncertainty involved in its estimates of these concepts. This has certainly been helpful. However, more could be done to communicate the implications of this uncertainty and to protect the conduct of monetary policy from the worst consequences of persistent biases in the estimation of the 'stars'. We briefly discuss two such approaches below, aiming to improve both policy communication and policy robustness.[16]

The first approach relates to the choice of the benchmark policy that underpins the SARB's policy projections. In light of the uncertainties faced by the SARB in estimating the 'star' variables in the QPM, the current specification of the policy rule embedded in the QPM is likely not the most efficient in terms of ensuring macroeconomic stability. It could be improved upon with policy research exploring the robustness of alternative policy rules in the QPM. Consider, for example, the following four-parameter generalization of Taylor rules:

$$i_t = \theta_i i_{t-1} + (1-\theta_i)(r_t^* + \pi^*) + \theta_\pi(\pi_t^e - \pi^*) + \theta_y y_t + \theta_{\Delta y}\Delta y_t^e$$

This formulation nests the three-parameter policy rule embedded in the QPM as a special case. It also nests an alternative family of two-parameter rules that correspond to the general rule when $\theta_i = 1$ and $\theta_y = 0$:

$$\Delta i_t = \theta_\pi(\pi_t^e - \pi^*) + \theta_{\Delta y}\Delta y_t^e$$

This family of two-parameter policy rules has been shown to better protect against natural rate misperceptions and to provide superior stabilization performance in models that share important characteristics with the SARB's QPM. It would be desirable to explore which, among these simple alternatives, is best suited as a benchmark policy rule for the South African economy. This would be useful input to the policy process.

The second potential improvement relates to the communication of policy uncertainty. At present, uncertainty in the SARB's projections is communicated through fan charts added around the baseline projections, e.g. of inflation and the policy path. The uncertainty in the fan charts is informed by historical statistics on forecast errors. While such fan charts are useful for communicating uncertainty, they are of limited value in informing the SARB's audience—businesses, households, and financial market participants—of more vexing risks to the outlook.

An alternative approach, which could supplement the currently provided fan charts, would be the addition of alternative risk scenarios as part of communication of the SARB's projections. This approach is especially useful for explaining the impact of plausible outcomes that may be considered low probability but might have asymmetric consequences for the economy. At times, analysis of such scenarios may reveal projected outcomes that are sufficiently concerning to meaningfully influence the setting of monetary policy in a way that would be difficult to communicate on the basis of the usual fan charts around the SARB's baseline projection. The presentation of plausible scenarios, even if they are not considered most likely, can highlight persistent or asymmetric risks that might otherwise be missed. Alternative scenarios could also

[16] This is necessarily brief. For a more detailed exposition see Orphanides (2020) and references therein.

include changes in the 'star' variables whose evolution has perplexed the SARB in the past, leading to persistent misperceptions.

Scenario analysis along these lines could become part of the SARB's continuing work programme, along with the perennial efforts to improve the models that the SARB employs for policy analysis.

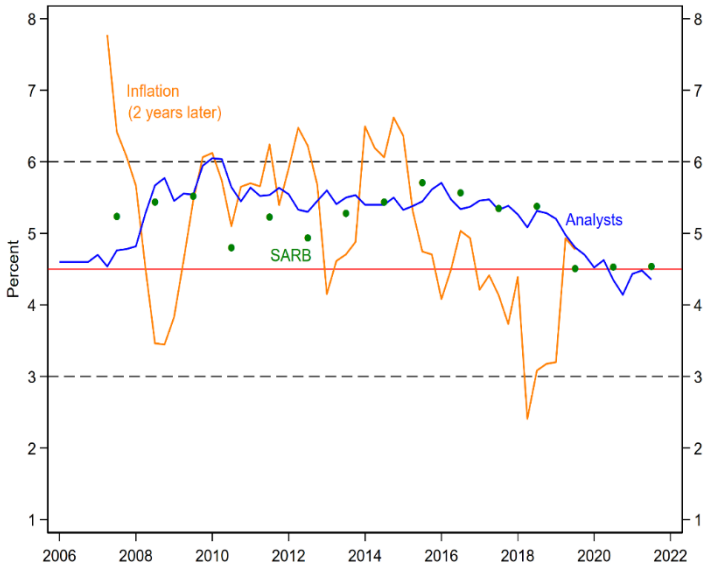
5 Anchoring expectations

Convincing financial markets and other economic agents of its ability and determination to achieve its goals is an important part of the monetary policy task of the SARB. In this respect, the record is not bad. Despite the various shocks experienced by the economy, inflation expectations were not destabilized and did not escape much beyond the band.[17]

Figure 11 plots the two-year-ahead inflation expectations of financial market analysts, as reflected in the quarterly BER survey (blue line), together with the comparable inflation projections published by the SARB in the second MPR of each year (green dots). The two series can also be compared with realized inflation (orange line), shifted by two years to provide a sense of the forecast errors of the analysts and the SARB. As can be seen, the analysts did no better than the SARB in 2006/07 at forecasting the surge of inflation that materialized two years later. They also shared the SARB's excessive pessimism in 2008/09 about the persistence of high inflation, missing the inflation decline registered two years later. On this reading, the analysts tended to be more pessimistic than the SARB about inflation prospects for 2011–13, and slightly more accurate. The sustained fall in inflation from 2017 was not generally expected, and analysts were slow to adjust their inflation forecast down even after lower inflation became a reality in 2017. The chart also suggests that analysts were a little slow to converge on the middle-of-the-band aim espoused by the SARB after inflation began to fall in 2017/18.

[17] This point is emphasized by Reis (2021); see also Kabundi et al. (2019).

Figure 11: Inflation—actual and expected



Note: analysts' expectations are from the quarterly BER survey and reflect expected inflation during the calendar year two years ahead; in each year, the green dot shows the comparable SARB projection of inflation, as reported in the second MPR of the year; the inflation series is shifted by two years to facilitate comparison of the forecasts with realized outcomes.

Source: authors' illustration based on SARB and BER data.

Indeed, the sustained decline in inflation from 2017 down to the middle of the band and below does not appear to have been at first the result of an active policy of the SARB. Despite having hiked the policy rate to 7 per cent earlier in the year, in the second half of 2016 SARB's two-years-ahead forecast for inflation was about 5.5 per cent (Figure 11), just a little below market expectations. But as inflation fell, the SARB seems to have seized the opportunity to aim more concretely at the middle of the band. With inflation expected to fall, an unchanged nominal policy rate became higher in real terms, thus further dampening inflation; the SARB was slow and measured in reducing the nominal policy rate and, in what may have been an important signal, actually increased it in late 2018 even though inflation was close to the middle of the band.

Improving the anchoring of inflation expectations depends both on policy actions and on communications strategy. The latter requires intimate local knowledge of the methods of communication and of the challenges of communicating through the media (see Reid et al. 2020). We do not, therefore, propose to offer any specific suggestions in this area.

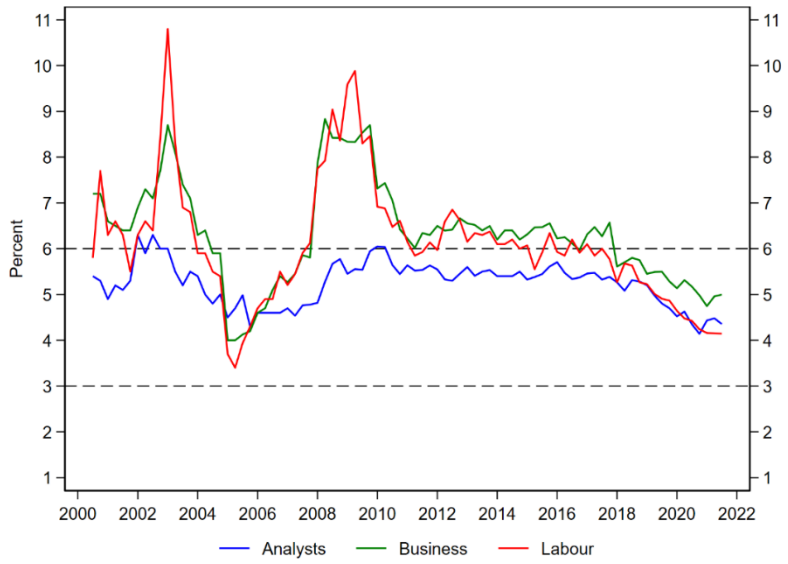
Since 2019, though, both market commentary and the survey evidence suggest that the SARB has been successful in re-anchoring inflation expectations around the middle of the band, rather than the upper edge, where they had been for several years (Figure 18).[18] This positions the SARB well

[18] The same conclusion is drawn by Coco and Viegi (2020). Earlier studies expressed concern that inflation expectations, especially of businesses and trade unions, were driven largely by recent actual inflation, rather than being firmly anchored (see Kabundi and Schaling 2013; Kabundi et al. 2015; Miyajima and Yetman 2018). While business and trade union inflation expectations have traditionally been higher than those of market analysts (as shown in Figure 12) the gap closed for trade unions from about 2017: perhaps they were more convinced than businesses by the clearer indications given by the SARB of an intention to stay closer to the middle of the band. Different demographic groups within households have distinctly different inflation expectations in South Africa: for example, younger respondents tend to report lower inflation expectations, a characteristic which some scholars have linked to the fact that their experience has been largely formed under inflation targeting (see Du Plessis et al. 2018). The same is true of more educated and higher-income respondents (see Reid et al. 2021).

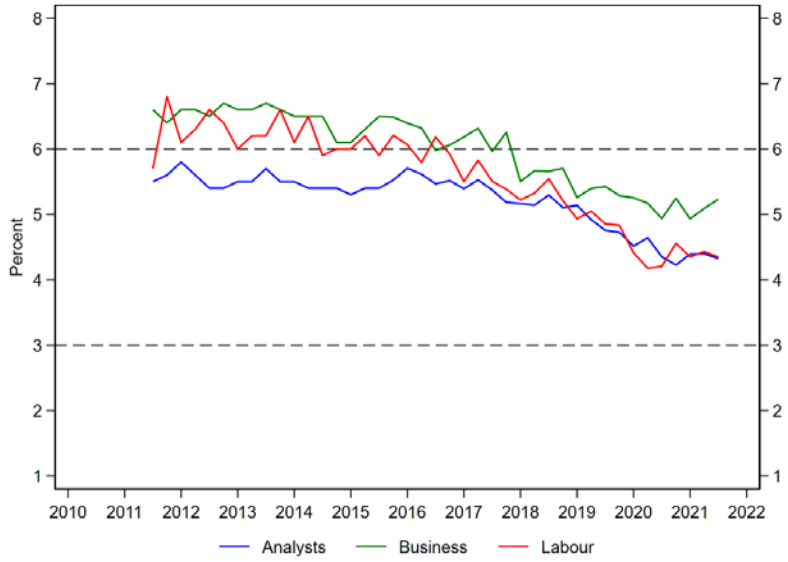
for a potential move to a point target rather than the band target which has been in effect since inflation targeting was introduced more than two decades ago.

Figure 12: Survey inflation expectations

12a: Two years ahead



12b: Five years ahead



Note: the inflation expectations shown are from the quarterly BER survey; they reflect expected inflation during the calendar year two years ahead (panel 12a) and five years ahead (panel 12b) from the quarter in which the survey is conducted.

Source: authors' illustration based on BER data.

6 A band versus a point target

Most inflation-targeting countries nowadays employ a point target, sometimes surrounded by a tolerance range. In contrast, South Africa has used a band of 3–6 per cent ever since inflation targeting began in 1999. But what is the difference? Although at first sight there might seem to be no difference at all, in practice the band has been interpreted as being more flexible for the medium-term evolution of inflation. Specifically described as a continuous target, the band has been interpreted as permitting the SARB to choose any point within the band as its medium-term target—a zone of indifference. Thus, for example, although there were periods in which the inflation rate moved above the band, the annual average inflation rate of in the region of 6 per cent throughout the period 2011–17 led to a general sense that the SARB was fulfilling its mandate.

A point target, in contrast, gives the monetary authority more flexibility to respond to the business cycle in a stabilizing manner. For example, if market expectations of medium-term inflation are anchored at a single point (rather than somewhere within a wide band), the central bank can lower interest rates more aggressively in a downturn without such action destabilizing expectations.

After all, if a steady 6 per cent inflation is consistent with the band, the SARB could equally be fulfilling its mandate if it kept inflation to about 3 per cent per annum during the entire period. But over a ten-year period, the higher inflation would result in a price level fully one-third higher than it would be with the lower inflation. Allowing such a variation over the long run clearly leaves a high degree of uncertainty about where the price level is going, making long-term contracting at fixed prices difficult, and necessarily resulting in high inflation risk premiums being added to long-term financial asset yields. The government and other long-term borrowers will tend to bear a heavy burden for this uncertainty, especially if inflation turns out to be appreciably lower than the upper bound of the band.

Noting this drawback of a band, why do some countries still retain it, or even—as in the case of Thailand—move from a point target to a range. The main point that is raised in defence of a band is that if inflation does escape well above the point target, the central bank is mandated to bring the rate back to the target over the medium term. In the words of the Bank of Thailand, to act in this way 'might have adverse side effects on other policy objectives'. However, if inflation expectations are not also de-anchored, the return to target need not be problematic.[19]

For South Africa, then, we do recommend that a point target be adopted: the SARB's mandate would be to maintain actual (and expected) inflation at close to this point over the medium term of three to four years. A tolerance range around this point target could be established with the following intention: the central bank should seek to avoid inflation moving outside the tolerance range, and should, if it does move outside the range for more than three months, be required to write a public letter to the Minister of Finance explaining why and outlining the SARB's plan for bringing inflation back closer to the target.

Recent discussions in the US and the euro area around whether the target should be achieved only in a forward-looking manner—therefore ignoring undershoots or overshoots in the past—do not need to be closely analysed at present, as this debate centres mainly around undershoots resulting

[19] Note that Thailand's band is only 200 bp wide; furthermore, with its investment grade rating and public debt ratio of about 50 per cent of GDP, the Thai government's debt is less likely to experience as high an inflation risk premium as does South Africa's, so the debt-servicing argument in favour of a point target over a band is less decisive in that case.

from the effective lower bound on policy rates having been reached. It is easier to justify ignoring as bygones transitory undershoots or overshoots resulting from exogenous terms of trade or supply shocks. The main argument against compensating by seeking to ensure that average inflation (including past inflation) comes on target is that such an objective is harder to communicate in a precise manner; the main argument in its favour is that such a mandate, if understood by market participants, can help to accelerate the return to target inflation.[20]

7 Choosing the inflation target

While surges and declines in South African inflation in recent years have been driven largely by shocks external to the monetary system, inflation was brought back to within the target band by the actions and credibility of the SARB. It was this that has limited the long-term impact of rising administrative prices and of financial market and labour market responses to expected inflation.

Allowing the inflation rate to surge well above the target without taking corrective action can trigger a feedback loop through exchange rate and labour market reactions, but this is much less likely for a central bank which has established a degree of credibility around its inflation target and shown its willingness to use its interest rate policy if necessary to bring inflation back under control. A surge of high inflation caused by exogenous shocks does not necessarily spiral away, but establishing and maintaining a credible inflation target is key to ensuring that it does not. It is much more difficult for the central bank to maintain price stability in the face of uncontrolled fiscal expansion: in this sense, a country's ability to maintain an effective inflation target at a low rate likely depends on political and administrative effectiveness beyond the remit of the central bank.

At what level should the inflation target for South Africa be set in future? Clearly, it should be the rate which provides the best monetary platform for sustained output growth.

In order to address this question it is useful to recall the reasons why monetary authorities have chosen targets that are higher than zero. After all, price stability is the stated goal, and the experience of many emerging economies (and indeed advanced economies during the 1970s) has been that high and variable inflation is inimical to sustained growth.

Nevertheless, all central banks with inflation targets have pitched them higher than zero. The reasons for this, as reprised (for example) in the European Central Bank (ECB) staff background paper for its 2021 MPR (Consolo et al. 2021), are at least threefold.

- First, there is reason to believe that, not least because of imperfections in how new goods and quality improvements are captured in the official statistics, true price inflation may be lower than measured inflation.
- Second, when an economy falls into recession or inflation falls below target, the main tool available to a central bank is a lowering of its policy interest rate. Too low a target inflation rate is likely to result in the central bank finding its policy rate close to zero in such circumstances and therefore unable to lower it much further to provide the boost to aggregate demand that the situation requires.

[20] There is also the point that contracts made on the assumption that the inflation target will be achieved on average may be sorely disappointed if misses are not compensated.

(Note that these two considerations are not additive: a higher-than-zero inflation target helps to ensure both that true inflation is not negative and that the effective lower bound is reached less frequently.)

- Third, many nominal prices and wages exhibit downward rigidity or stickiness. In the face of shifting conditions of relative demand, supply of raw materials, technology, and the international terms of trade, such frictions can result in economic disruption, including job losses and bankruptcies. Therefore, to the extent that relative prices need to change over time if the economy is to remain efficient and at full employment, it will be better if these relative price changes can be accomplished without much need for downward nominal adjustment.

Each of these reasons has long been known and each was surely considered in South Africa when inflation-targeting regime was adopted in 1999. Quantifying their importance in any particular economy is not simple. Estimates of the scale of the bias in statistics for advanced economies suggest that it may be between 0.5 and one percentage points per year. Despite the acceleration of new products and quality changes resulting from globalization and increasing reliance on information technology, this problem does not appear to have worsened in advanced economies in recent years, partly because of improvements in data collection and the construction of the price indexes. The South African CPI is generally constructed in line with established international standards. While it has limitations, we are not aware of systematic reasons to expect a higher bias in the inflation estimates for South Africa.

The second problem has loomed much larger in recent years as all of the advanced economies have seen their policy rate reach the effective lower bound, inhibiting further needed monetary expansion. Apparently, this is because long-term movements in its structural determinants have pushed the neutral real interest rate ($r*$) lower in these countries over the past decades. Because of this there has been much discussion of whether it would be better for those countries to have chosen a target inflation rate higher than 2 per cent, with some economists advocating 3 or even 4 per cent.

Precision in estimating $r*$ is elusive even in advanced economies. The Federal Reserve and the ECB have each published a range of estimates that is about 150 bp wide—centred around +1 per cent for the US and about −0.4 per cent for the euro area. Recent work at the SARB (Kuhn et al. 2019), applying a standard technique, estimates that $r*$ in South Africa fell from about 4.4 per cent in 2000–06 to about 1.9 per cent in 2017. SARB's estimate has been updated on a regular basis and stood at 2.2 per cent at the end of 2021. If $r*$ is around 2 per cent, this second problem (effective lower bound) is much more relevant now in South Africa than in the early years of inflation targeting, but it is not yet as pressing as in the US or especially the euro area.

That leaves the third problem, namely the question of downward price and wage rigidity. In assessing the extent to which this might be more severe in South Africa than in advanced economies, account should be taken both of the *degree* of rigidity and of the *frequency and extent* of needed equilibrium relative to price changes. It has often been assumed that both factors are more acute in emerging economies, and this has prompted many inflation-targeting countries to adopt higher inflation targets than 2 per cent. Nevertheless, there has been a trend in recent decades for some tightening of these higher inflation targets; among G20 emerging economies, Mexico, South Korea, and Thailand all have effective inflation targets at 3 per cent or less. Those with higher inflation targets have each seen double-digit surges within the past decade (Argentina, Brazil, India, Russia, and Turkey).

In practice it is not easy to assess either of these factors quantitatively. Administrative prices that are increased at rates above the inflation target would be one source of such pressures which has been highly relevant in South Africa and seems likely to continue, unless alternative policies are found to deal with cost inefficiencies and other problems in some public corporations. On the other hand, the modest pace of productivity growth in manufacturing in recent years in South Africa suggests that the kind of trend-relative price changes emphasized in the model of Balassa and Samuelson (which would also tend to result in a trend appreciation of the rand) has not been strongly relevant. Analysis of the frequency of price and wage changes at the microeconomic and sectoral level in South Africa, and of the degree to which prices and wages are in fact downwardly inflexible, is a topic deserving further research.

How does the midpoint of the SARB's current target band (4.45 per cent) seem in the light of these considerations? All in all, this rate seems to provide ample room for the three points raised; indeed, a somewhat lower rate would also satisfy these requirements, though going below 3 per cent might be unwise.

Would maintaining inflation close to a lower target than at present result in contractionary policies that would constrain employment and output growth in an unwarranted manner? This fear is often expressed. The answer depends in part on the starting position. The experience of other countries suggests that if South Africa was experiencing an entrenched psychology of high inflation and high inflation expectations, it would indeed be difficult to avoid a period of below-trend growth while inflation and inflation expectations were brought down: it is rare that a mere announcement is sufficient. On the other hand, the decline in inflation in South Africa since 2017 has been accompanied by a decline in expectations close to midpoint of the existing target range. Confirming this, or a somewhat lower rate, as the target for the future would not imply disinflationary costs.

At the outset, the 3–6 per cent target band was set for the three-year period ending in 2003, but even then it was intended that the band would be narrowed and lowered when actual and expected inflation had fallen convincingly.[21] In 2001 it was announced that the band would be narrowed to 3–5 per cent for 2004; in the face of actual and forecast overshoots, this narrowing was postponed by one year in 2002. The plan to narrow and lower the band was derailed by further adverse shocks which drove inflation into double digits in 2002, and so the band stayed at its initial value, where it remains today.

The above discussion suggests that a midpoint target of 4 per cent, as was originally envisaged, could safely be adopted once expectations were in line. The three considerations discussed above would not provide an argument against an even lower midpoint of 3 per cent.

The same reasoning implies, though, that maintaining inflation expectations close to a new, lower, target would be vital. A re-escape of inflation and inflation expectations to high levels would imply future output losses as stability was being restored.

A decision to opt for 3 per cent as the point target would thus need to be accompanied by a commitment from the fiscal authorities to play their part and maintain budgetary policy and policy on administered prices consistent with the chosen inflation rate. Indeed, for such a move to be credible to financial and labour market participants, there would have to be wholehearted buy-in from the fiscal authorities. Only if the move was credible could transition costs be avoided.

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[21] At that stage the target variable was CPIX—excluding the effects of mortgage interest rate changes.

8 Monetary policy and the government's borrowing costs

The operation of monetary policy clearly has implications for nominal short-term interest rates in the money market, as the SARB adjusts repo to ensure the achievement of the inflation target. Thus, for example, the current (11 December 2021) South African Benchmark Overnight Rate (SABOR, measuring the cost of overnight or call funds in the interbank and wholesale money market)[22] of 3.48 per cent is almost the same as repo (3.50 per cent) and not far below the 91-day Treasury Bill rate of 3.73 per cent.

Yields increase steeply with maturity. The 364-day Treasury Bill rate is over 5 per cent, and the average yield of three- to five-year government bonds is about 8 per cent, while that of bonds of ten years and over is about 10 per cent (Soobyah and Steenkamp 2020). This slope is unusually steep by international standards and has become much wider since the pandemic led to a sharp lowering of repo in early 2020. Indeed, while timely asset purchases by the SARB removed most of the spike which had occurred in long-term bond yields during the financial market panic at the outset of the pandemic in March 2020, ten-year yields remained higher in 2021 than they had been during most of the previous decade and more—seemingly unaffected by the lowering of repo.

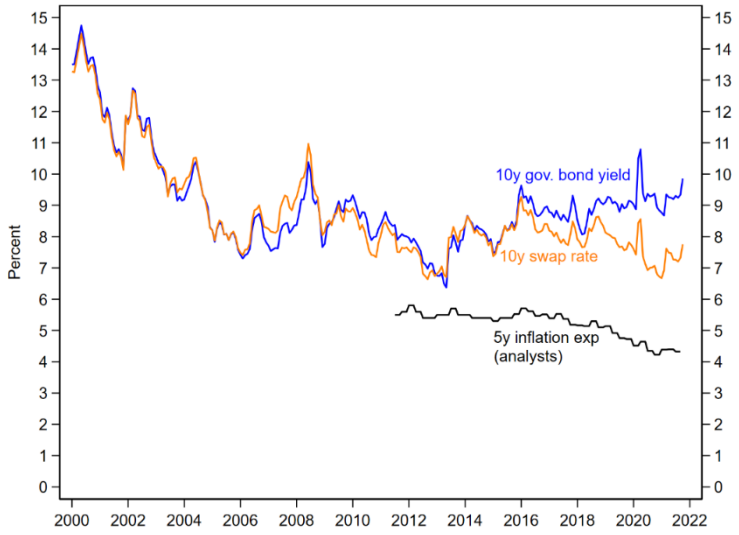
How, then, should we think of the impact of monetary policy on long-term government bond yields. Conventional theories of the bond yield curve assume that long-term yields are formed of two main components: first, the average expected value of future short-term interest rates; and second, a risk premium, known as the term premium, to reflect the deviations that might occur relative to that expectation. From another perspective, the yield on long-term domestic currency bonds should equate to that on foreign-currency-denominated bonds plus a risk premium to take account of anticipated exchange rate changes and any differential credit risk. The two perspectives should converge.

South Africa does issue debt denominated in foreign currency, the pricing of which is strongly influenced by that of the debt of other countries. With its long-term credit rating three notches below investment grade, and the historically high and rising government debt ratio, South African government bonds denominated in foreign currency need to yield a credit risk premium as well as a liquidity premium relative to the large issues of highly rated issuers. A close proxy for the credit risk premium is actually observable in the credit default swap (CDS) market. As shown in Figure 13, five-year CDS rates on South African US dollar bonds have averaged about 200 bp (which is also its current level) and have had some peaks of over 400 bp.

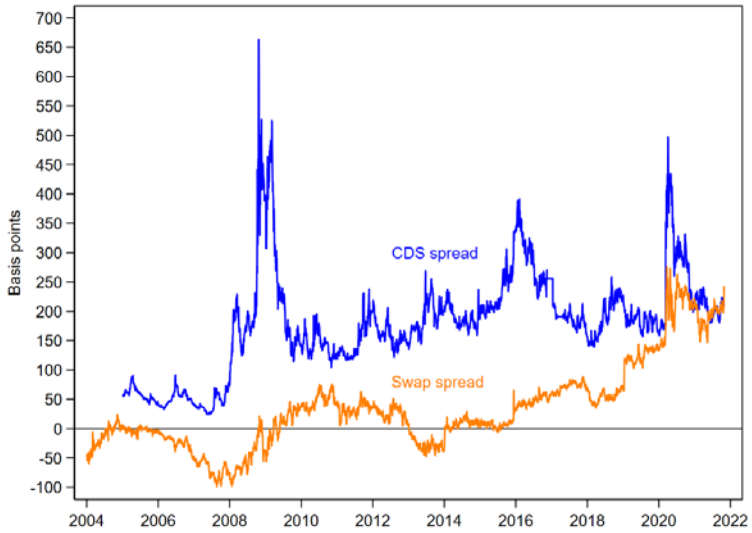
[22]According to the SARB, SABOR is made up of three components: transactions-based data on overnight funding raised in the interbank market, call deposit funding raised from the main banks' top 20 non-bank corporate clients, and overnight funding raised from the foreign exchange forward market. (SARB 2007).

Figure 13: Non-monetary factors in bond yields

13a: Inflation expectations, bond yields, and swap rates



13b: CDS spreads and swap spreads



Note: swap spread (panel 12b) is ten-year government bond yield minus ten-year swap rate; analysts' five-year inflation expectations (panel 12a) are from the BER survey.

Source: authors' illustration based on SARB and BER data.

Applying conventional bond yield theories to the bonds of an issuer where there is credit (default/restructuring) risk needs care. Absent credit risk, the flow of funds from holding a bond is known; it is the competitive alternative of rolling over a sequence of shorter-dated instruments that is uncertain. Thus, the term premium on domestic government bonds will also include a credit risk element. This need not be the same as the credit risk on foreign currency bonds, inasmuch as debt restructurings do not typically apply uniform haircuts across all instruments. Indeed, for political and other reasons, domestic issues tend not be as heavily haircut, though unanticipated inflation may erode their real value by more.

Nevertheless, as many investors have a choice between holding the debt ,whether denominated in rand or in foreign currency, it can be taken that some equivalence in risk and return in real terms

will be established in the market. The theory of purchasing power parity suggests that expected inflation and depreciation rates would be closely related over time—this being the most important channel through which monetary policy influences medium-term exchange rate movements. Thus, until late 2019 there was a relatively small difference between the CDS spreads on South African government bonds denominated in US dollars, on the one hand, and market expectations of long-run inflation differentials between the US and South Africa, on the other. (During 2020, though, the gap widened.)[23]

Remarkably, in the case of South Africa a sizeable gap has opened up since mid-2019 between long-term government bond yields and the cost of long-term borrowing by South African banks, both denominated in rand (Figure 13). The spread spiked at the outbreak of the pandemic before narrowing, and remains close to 250 bp at mid-November 2021. This suggests that market participants attach a significantly lower risk of debt restructuring to South African banks than to the sovereign. Although not unique, this position contrasts with the situation in most countries, where the sovereign can borrow at lower rates than any other local entity. Indeed, before 2019 this spread was less than 100 bp in absolute terms, and it was negative during 2013 and 2014.

What impact, then, can a lower inflation target, if credible to the market, have on South African government borrowing costs? Three separate channels can be identified. To be sure, these costs will be lower to the extent that a stable monetary policy regime is successful in providing a platform for stronger economic growth, as this in turn will improve the government's ability to mobilize tax resources over time and therefore its ability to service debt. This will lower credit/default premiums. An additional reduction in *nominal* debt service charges can be expected if a lower inflation target becomes reflected in lower long-term *nominal* interest rates. The third channel may be the most important. If market inflation expectations exceed actual future inflation, then *real* debt servicing charges will prove to have been higher than expected by the market. This is likely to have already been relevant in South Africa given the period in 2011–17 when market participants' expectations centred around the top of the band at 6 per cent, whereas subsequent inflation has averaged considerably lower.

Indeed, according to estimates made by researchers at the SARB (Soobyah and Steenkamp 2019), the market has, since the early 2000s, consistently priced government bonds as if it expected short-term interest rates to average around 8 per cent over the following decade.

This finding depends heavily on several assumptions about the process of yield determination, but if we take the neutral real interest rate, $r*$, to be about 2 per cent (Kuhn et al. 2019), this expectation implies that expected inflation over the following decade would be about 6 per cent. This does suggest the likelihood that, were the market convinced that inflation would average at, say, two percentage points lower, bond yields would be about 2 per cent lower.

The impact of monetary policy on short-term bill and bond yields is influenced less by long-term inflation expectations and more by the repo rate (for very short-term rates) and by expectations of inflation over the immediate future for yields in the one- to three-year range. At present, default risk, which seems to have jumped since mid-2019 and especially in 2002, seems to be concentrated on more distant maturities.

[23] The determinants of credit risk premiums for South Africa have recently been explored econometrically by Loate et al. (2021).

Since 2018, the lower expected inflation over the coming few years has (combined with the lower repo rates in effect since early 2020) lowered the short-term yields without lowering long-term yields.

Lower long-term bond yields can therefore be achieved by lowering long-term inflation expectations and by reducing default risk. These lower nominal bond yields will mean a lower real cost of funds for future borrowing (including refinancing), to the extent that expectations are lowered promptly and do not lag behind a lowering of actual inflation. A successful refocusing of monetary policy on a lower point target should be effective here.

However, falling bond yields will also generate capital gains for holders, which might have adverse effects on inequality of *wealth*; it will also result in lower returns on new saving, potentially improving the distribution of *income*.

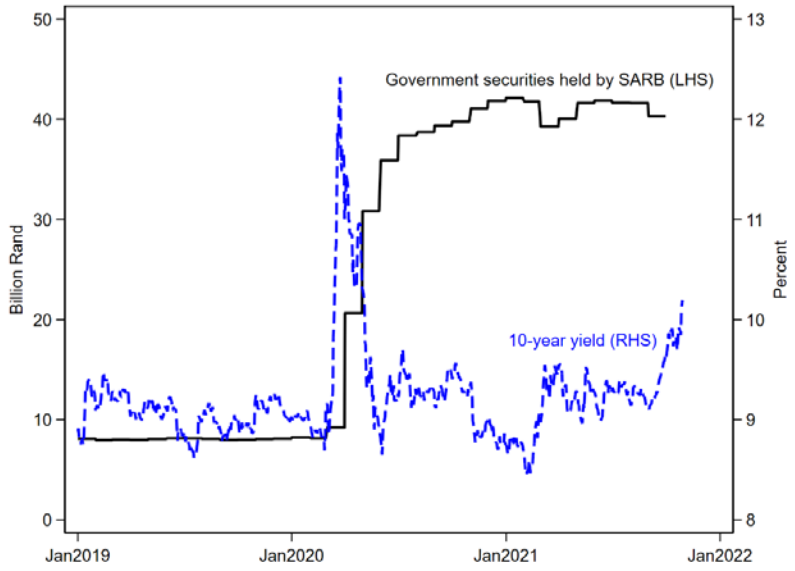
9 Asset purchases

Of the global events spilling over into South African monetary policy, which, as mentioned, include international energy price spikes and the GFC, the biggest of all has been the COVID-19 pandemic. In addition to the steep reduction in policy interest rate, the most striking policy action by the SARB at the outset of this crisis was its decision to purchase government bonds.

During 2020 the SARB purchased about a net ZAR30 bn of government bonds in the secondary market. The purchases started in March; most were in April and May, and purchasing had tapered off to less than ZAR1 bn by August (Figure 14). The net total came to about 0.6 per cent of 2020 GDP.

These purchases were a response to the short-lived financial market panic which swept the world's money markets after the outbreak of the pandemic. The attempt by many leveraged investors to liquidate positions that were exposed to an economic downturn resulted in sharp declines in the price of financial assets, even including super-safe assets such as US Treasury Bonds, It was in response to this market dysfunction that many advanced economies' central banks, including the Federal Reserve, the ECB, and the Bank of England, for example, stepped into the market, buying aggressively to ensure that market panic would not spill over into availability of credit and thus to prevent an even sharper decline in economic activity than occurred.

Figure 14: Crisis management during the pandemic



Source: authors' illustration based on SARB data.

The SARB's action can be seen in the same light. It was clearly intended to restore market functioning. The yield on ten-year South African government bonds jumped within a couple of weeks in March 2002 from below 9 per cent to more than 12 per cent. Following the SARB's announcement of asset purchases, this yield fell by about 150 bp in one hour (Arslan et al. 2020).[24] Following the first two months of bond purchases by the SARB, the yield had come back down to below 9 per cent. It has subsequently fluctuated between about 9 and about 9.5 per cent.

The Federal Reserve and the Bank of England also lowered their policy rates in March 2020, as did, of course, the SARB. The combination of asset purchases and short-term policy rate lowering saw the South Africa government two-year yield, which had also spiked in mid-March, fall even further than that of the longer-dated bonds, briefly dipping below 4 per cent, before returning to the vicinity of 5 per cent, lower than pre-pandemic.

The central banks of several other emerging market and developing economies (EMDEs)_also engaged in outright asset purchase programmes during 2020 (Adrian et al. 2021; see also Arslan et al. 2020). Of 14 such programmes, seven[25] were considerably larger than that undertaken by the SARB, with amounts ranging between about 4 and 9 per cent of GDP. (Four of these countries were already at or close to the lower bound, with a policy rate at or below 1 per cent.) The asset purchases by the large advanced-economy central banks were much larger, as a percentage of GDP.

Although aggregate output in South Africa has recovered strongly after the initial pandemic shock, it remains below pre-pandemic levels; potential output has also fallen, and is now projected to rise along a shallower path than was expected pre-pandemic (Figure 9). The question naturally arises as to whether there is scope in South Africa for a greater quantity of asset purchases to support economic growth and ease fiscal constraints. A number of considerations strongly suggest that

[24] Interestingly, the rand appreciated by about 1 per cent at the same time.

[25] Chile, Croatia, Ghana, Hungary, Indonesia, Philippines, and Poland (according to Adrian et al. 2021).

increased reliance on central bank financing by the government, even if indirectly through secondary market purchases, is likely to prove counterproductive.

First, it needs to be recalled that advanced-economy reliance on quantitative easing (QE) to produce easier monetary conditions is essentially the consequence of having reached the effective lower bound on short-term policy rates. Six of the EMDE countries that undertook asset purchase programmes in 2020 were in the same position. In order to provide further easing, these central banks have attempted to convince markets that policy rates will remain low for a long time, but have had to purchase government bonds to achieve much flattening of the yield curve. South Africa is well away from the effective lower bound.

Second, 2020 was a year of most unusual economic and financial market conditions. Policy innovations were needed and were tolerated by markets as temporary expedients, rather than an indication of an orientation towards future policy. It is clear from the experience of countries such as Argentina and Turkey that financial markets continue to react to what they perceive as lax monetary and fiscal policy in a way that increases government bond yields, accelerates currency depreciation and inflation, and results in turbulent and uncertain conditions that worsens output and employment performance.

Bearing in mind the weak credit rating of the government, the relatively high credit risk, and currency depreciation risk premiums embedded in government bond yields, it seems clear that South Africa is vulnerable to—and could quickly become a victim of—such adverse financial market dynamics.

10 Transparency

The transparency of central banks has become recognized as an important way both of ensuring the transmission of their policy objectives and intentions to economic and financial market participants and of bolstering their accountability and democratic legitimacy.

The SARB provides a wealth of economic and financial information and analysis. Its twice-yearly MPR contains the information needed to understand the bank's thinking and policy intentions. It holds press conferences and briefings for analysts following its monetary policy decisions.

A fair amount of information about the SARB's QPM is made available: it appears that the SARB would be willing to share more information on this with interested parties.

Still, there is scope for more transparency. For one thing, this is suggested by international comparisons. Attempts have been made by scholars to score various aspects of central bank transparency around the world. A recent example is by Oikonomou and Spyromitros (2017), who used an established methodology to report on transparency in 2016 at 35 central banks, among which the SARB ranks joint 22nd for overall transparency.[26]

[26] The countries included were Canada, USA, Australia, New Zealand, Hong Kong, Japan, Singapore, Israel, Denmark, Iceland, Norway, Sweden, the United Kingdom, Switzerland, Egypt, South Africa, Mexico, Chile, Korea, India, Indonesia, Malaysia, Philippines, Thailand, Saudi Arabia, Turkey, Hungary, Russia, Jamaica, Argentina, Jordan, Romania, Ukraine, Croatia, and the ECB. The authors provide rankings for sub-elements of their overall transparency index. For the operational aspect, the SARB ranks joint 15th, for the policy aspect joint 21st. As for the economic

Our own impression is more favourable. Nevertheless, we note that minutes of the MPC are not published, nor are minutes of the meetings between senior SARB officials and the National Treasury. It would seem desirable to make such minutes available even if they were brief and subject to editing for the purpose of ensuring policy effectiveness. For monetary policy to be effective, economic agents need to understand what the central bank is doing and why it is doing it: publication of minutes can help that understanding.

Published minutes could also serve as a means of providing more information than is currently available about the views and policy intentions of the policy committee. As noted earlier, much of the detailed information provided at present, importantly including economic projections and the projections of the repo rate, reflects the views of the SARB's staff, with insufficient clarity on how these may differ from the views of the policy committee.

11 Governance and the relationship with treasury and parliament

Effective monetary policy in today's world depends on the central bank being independent of political pressures. Maintaining such independence is as much a question of retaining the respect of the general public and of convincing decision-makers that the economic welfare of the country depends on monetary stability as it is of precise legislative provisions. After all, legislation can be amended by political decision, and political pressures can anyway be exerted in ways not easily anticipated and forestalled in the wording of Acts of Parliament.

International comparisons of central bank legislation suggest that the SARB has been granted relatively little formal or *de jure* independence by legislators. The most recent academic compilation (relating to 2017) confirms the findings of other studies suggesting relatively the low level of independence of the SARB. Specifically, it ranks the independence of the SARB as 132nd out of 154 countries (and 36th out of 39 in Sub-Saharan Africa). An examination of the rankings for each of the subheadings of which the overall index is composed shows the greatest limitations on the SARB's statutory independence to be in the areas of (i) lending to the government (151st), (ii) clarity of objectives (136th), and (ii) requirements for reporting and disclosure (123rd).

Although each aspect of central bank independence can be relevant in ensuring the effective delivery of its mandate, it comes as a relief to note that in the specific area of 'formulation and delivery of monetary policy and resolution of conflicts' with other parts of the state apparatus, the SARB's statutory independence ranking is much higher (13th place).[27]

How concerned should South Africans be about this apparent low ranking on central bank independence? Conventional wisdom argues in favour of central banks being endowed by law with financial and personal autonomy and the independence to choose policy instruments to meet their statutory goals. This view draws on the worldwide experience (especially in the middle decades of the last century) of political decisions resulting in high inflation in countries where the central bank was subordinate to the ministry of finance. It is also supported by empirical evidence, linking low and stable inflation to central bank independence.

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aspect of transparency (covering disclosure of data and models) the ranking is somewhat lower at joint 26th; for procedural aspects it is one rank lower.

[27] These rankings are from Romelli (2021); similar results are found, for example, in Garriga (2016). The other areas relate to the governor and central bank board (94th) and financial independence of the central bank (104th).

The reason for the SARB's low ranking can be traced to the limited amount of legislative language devoted in South Africa to the various dimensions of central bank independence emphasized by scholars.

However, the Constitution of the Republic contains a forceful and concise statement to which the Reserve Bank could appeal in case an attempt was made to exert pressure on it. Article 224(2) states: 'The South African Reserve Bank, in pursuit of its primary object, must perform its functions independently and without fear, favour or prejudice, but there must be regular consultation between the Bank and the Cabinet member responsible for national financial matters'.[28] We have been assured that no attempts to interfere with the SARB's ability to do this are made.

Indeed, the record of the SARB over what was a difficult number of years in terms of the quality of political governance in South Africa points to a degree of *de facto* independence far higher than is suggested in the studies of *de jure* independence that emphasize legislation. This surely reflects the impact of personalities, both at the bank and in parts of the government administration.

It is true that a close working relationship between the Reserve Bank and the National Treasury has long been established. Most members of the bank's MPC have served in the past in a senior position in the National Treasury. It is worth bearing in mind that the goals and mandate of the treasury are not the same as those of the bank, and there should be no presumption that prior experience at the treasury is a prerequisite for any senior position at the bank.

However, our observation is that the close ties that have existed between the bank and treasury have in practice delivered a reasonable *de facto* degree of autonomy and independence to the bank in pursuing its primary constitutional object, namely 'to protect the value of the currency in the interest of balanced and sustainable economic growth'.

Relying on personalities is always hazardous, and in time it may be advisable to codify elements of central bank independence in statute law. But opening such a discussion can be destabilizing in itself, and there does not seem to be an immediate need. Accordingly, we do not recommend that this *de facto* equilibrium be disturbed at present.

Indeed, it would be important for the drafters of any future revision of central bank regulation to avoid language that might erode this independence, for example through an undue overburdening of the central bank's mandate with additional objectives that could lead in practice to political interference, likely threatening the bank's primary statutory objective.

A 2010 letter from the minister of finance to the governor elaborates on the sorts of considerations that should influence the Reserve Bank's policy response in bringing the inflation rate back to within the target range whenever a deviation occurs. These factors were to include 'the source of the inflation shock, the size of the gap between actual and potential growth, credit extension and asset bubbles, employment and other labour market developments, and the stability and competitiveness of the exchange rate'. It would be hard to disagree with the relevance of any of these considerations. They are not absent from the policy communications of the SARB; greater

[28] A slightly less independent role is envisaged in the wording of the Financial Sector Regulation Act 2017, which added an explicit statutory responsibility of the Reserve Bank 'for protecting and enhancing financial stability and, if a systemic event has occurred, for restoring or maintaining financial stability'. When fulfilling this responsibility it 'must act within a policy framework agreed between the Minister and the Governor'. But this, of course, does not weaken the constitutional protection regarding pursuit of its primary object.

emphasis in communicating the importance of such aspects and how they enter the decision-making process of the bank might be useful in forestalling ill-advised attempts to constrain the bank's independence in these matters.

Legislation in 2017 added an explicit mandate for the SARB to protect and enhance financial stability, and spelled out some approaches that should be used to this end. This mandate effectively supports the primary constitutional mandate. The measures of early 2020 can be seen as fully consistent with this financial stability mandate.

Other goals that are sometimes considered worth adding to central banks' mandates include reductions in inequality and the problem of climate change. Both aspects can be considered to be already covered by the Constitution's injunction to work 'in the interest of balanced and sustainable economic growth'.

Inequality

While the main goal of monetary policy is to maintain a stable price environment as a platform on which economic growth and prosperity can be built, there has been increasing discussion in recent years of the impact of monetary policy on inequality, much of this driven by the conspicuous impact of asset purchases (QE) on the market price of financial assets.

The high level of income and wealth inequality in South Africa does not have its roots in monetary policy. Nevertheless, it is right to pay attention to any approach to monetary policy that might systematically worsen inequality. In fact, there are many channels—direct and indirect, some mutually reinforcing, some offsetting—through which monetary policy can affect the distribution of income and wealth (see Colciago et al. 2019). Cross-country research focusing on average inflation rates suggests that above a certain level, inflation tends to worsen inequality. Judging from surveys of empirical research, the short-run impact on inequality of expansionary or contractionary monetary policies is less clear and seems to depend on the initial conditions. Monetary expansion when the output gap is large can somewhat reduce inequality, whereas the opposite may be true if the output gap is not large (Honohan 2019). Averaging over the business cycle, Merrino (2021) concludes that countercyclical monetary policy in South Africa has lowered wage inequality.[29]

12 Concluding remarks

South Africa is far from the only country faced with a sudden increase in inflation during 2021, driven by a number of factors, not least the global surge in petroleum prices. Retaining credibility for its determination and ability to deliver on the inflation target, the SARB has begun to reduce the degree of expansion being provided by monetary policy.

As South Africa enters a post-pandemic monetary environment that will undoubtedly be challenging, the opportunity should be taken to reaffirm the national government's commitment to stability in the value of the currency, concentrating on a point target and avoiding any misplaced dilution of the SARB's mandate.

[29] The potential role of the central bank in contributing to the battle against climate change is another area which has received attention worldwide. The main issues here relate, however, to the choice of private sector securities in QE or as acceptable collateral, and to the inclusion of climate risks in bank supervision. The first of these is not currently relevant for the SARB; the latter lies outside the scope of this study.

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Appendix: Recommendations

1. The price stability mandate of the central bank, as set out in the Constitution and elaborated in the letter of 2010, continues to serve South Africa well. An expansion of the mandate risks losing focus and damaging growth and welfare.
2. The inflation target set for monetary policy has been achieved—and more solidly so in the past four years. Maintaining and ideally strengthening the credibility of the SARB's inflation target must remain the key objective.
3. The current definition of the target—a 3–6 per cent band—is not ambitious enough and significantly reduces the benefits that the inflation-targeting framework could otherwise provide.
4. The definition of the target as a 3–6 per cent band should be replaced by a point target to better anchor inflation expectations and enhance the effectiveness of monetary policy.
5. The tolerance for fluctuations around the point target should be more carefully explained than is the existing band.
6. South Africa should plan on reducing the point target from 4.5 per cent; an eventual 3 per cent would better promote growth and would still be high enough to avoid undue risk of hitting the lower bound. Note, however, that this would require the fiscal authority to play its part, notably to avoid high increases in administered prices.
7. The QPM is a standard-type gap model and provides a useful benchmark for policy decisions. But estimating the gaps (and star variables) has been an uncertain exercise. For example, the estimated output gap and $r*$ have both been revised down repeatedly and substantially. Satellite models for these gap variables deserve continuous development.
8. There is tendency for the QPM's projections and implied policy path to be given undue prominence: SARB communication should highlight the role of non-model-based judgement in policy choice.
9. The policy process could benefit from enhanced robustness analysis and the inclusion of risk scenarios. Alternative benchmark policy rules could be explored with the aim of better protecting against uncertainty and improving stabilization performance.
10. The response to the 2020 pandemic-related financial panic was well judged and proportionate. The purchase of government bonds was necessarily temporary and appropriately moderate. It should not be used as a means of financing government in normal times.
11. The effectiveness of monetary policy could be enhanced by increasing transparency, for example by publishing summary minutes of the monetary policy meetings and of the dialogue between SARB and National Treasury.
12. Although there is comparatively little detail in legal prescriptions, no immediate changes are recommended in the formal governance of the monetary policy regime while it continues to deliver sufficient independence.