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Review of Monetary Policy in South Africa since 1994

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Abstract

This paper reviews the design and performance of monetary policy in South Africa (SA) during 1994-2004. Quantitative indexes of transparency reveal a strong rise in the transparency and accountability of monetary policy between 1994 and 2004. Inflation and interest rate expectations data and forward interest rate data are used to demonstrate the increased credibility and reasonable predictability of monetary policy since adopting inflation targeting in 2000. The SA Reserve Bank's view on monetary policy transmission channels is discussed, and its recent forecasting performance is evaluated. We find that monetary policy decisions taken in response to external and domestic shocks under inflation targeting have significantly improved relative to the preceding framework, though data quality has been a constraint. Further, inflation targeting has not disadvantaged potential investment in terms of the level of tax-adjusted real interest rates. Finally, the important role for complementary policies to support monetary policy is motivated.

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1. Introduction[1]

Acquiring credibility and a good reputation in macro-policy is a key for attracting foreign investment, and encouraging long-term domestic investment (Aron and Muellbauer, 2005). In this paper, we examine the monetary policy legacy of the last decade. We argue that the inflation targeting framework introduced in 2000, see Van der Merwe (2004), has improved the credibility and effectiveness of macro-economic policy. The criticism the new framework has received is largely misconceived.

Figure 1 shows the growth, inflation and interest rate record for South Africa (SA) since 1990. From 2000, the record shows a marked improvement, despite the nominal exchange rate shock in the last quarter of 2001, which together with regional grain price rises, raised inflation in 2002-2003. The moderate interest rate response to the 2001 currency depreciation contrasts favourably with the savage rate rises in the 1997-1998 currency depreciation, and misguided currency market interventions, incurring great costs to the public finances and in growth foregone. In Table 1, we compare some macroeconomic aggregates and their volatility[2] by the period of office of central bank governor and the government in power. This yields four distinct phases: De Kock (National Party), Stals (National Party), Stals (ANC) and Mboweni (ANC), the last of these largely coinciding with the move to inflation targeting, announced in February 2000.

Under Governor Mboweni there has been a decline in nominal currency depreciation, in nominal interest rates, and in inflation. Per capita GDP growth has improved significantly, particularly compared to the substantial declines in output per head under de Kock and in the first Stals period. The volatility of output growth but not of real interest rates has declined under Mboweni. Real interest rates on average are lower than under the second Stals period, but substantially higher than under De Kock and in the first Stals period. The volatility of changes in nominal interest rates and in CPI inflation, however, are higher than in the second Stals period, given larger exchange rate shocks.

What interpretation to put on these comparisons is far from obvious. There has been much international debate about the causes of the 'great moderation': that is, the decline in inflation, inflation volatility and output volatility observed across the industrialised world since

[1] This is an independent review of monetary and exchange rate policy in South Africa during 1994-2004. It has been conducted with publicly available information, and without access to unpublished minutes of MPC meetings, unpublished econometric models, or unpublished memos of the South African Reserve Bank. A review commissioned from P. Mohr in 2001, with access to MPC meetings, has never been published (see media statement, July 2001, South African Reserve Bank website).

[2] This measure is defined as the absolute value of the difference in annual percentage rates of change between a variable in the current quarter and its value 4 quarters ago.

the early 1980s, see Bernanke (2004). We will argue that the new monetary policy regime has enabled South Africa to participate in these global trends, despite major exchange rate shocks.

The outline of the paper is as follows. In Section 2, we review the design and operational framework of monetary policy. Section 3 assesses the view of the South African Reserve Bank (SARB) on monetary policy transmission. In Section 4, the transparency, credibility and predictability of monetary policy is examined. We construct quantitative indexes of transparency in 1994 and 2004 and consider whether the transparency of the SARB has been increased by adopting inflation targeting. Expectations data and forward interest rate data are used to assess the changing credibility and predictability of policy under inflation targeting. In Section 5 the forecasting performance of the SARB is evaluated, and monetary policy decisions taken in response to external and domestic shocks in both the Stals and Mboweni eras are critically assessed. We also consider whether monetary policy has reduced interest rate and output volatility, and has stabilised the business cycle. In Section 6, we tackle the controversial issue of whether real interest rates have been too high in SA, and to what extent this is linked with the inflation targeting regime. Section 7 concludes with a summary, and a discussion of the limits of monetary policy and the important role for complementary policies.

2. The design and operational framework of monetary policy

2.1 Monetary policy regimes prior to inflation targeting

There have been three broad monetary policy regimes since the 1960s (Table 2). The first regime was a *liquid asset ratio-based system* with quantitative controls on interest rates and credit, and operated until the early 1980s. A range of reforms enacted from the early 1980s toward a *cash reserves-based system* followed the recommendations of the de Kock Commission Reports (1978, 1985). After gradual technical changes on assets requirements, and a redefinition of the role of the discount rate, this second regime was in full operation by mid-1985 (see Gidlow, 1995a,b).

Under the cash reserves system, the SARB's discount rate influenced the cost of overnight collateralised lending and hence market interest rates. The supply of credit was influenced by open market operations and various other policies acting on overall liquidity. By creating a persistent "money market shortage" and setting the bank rate at a relatively high level, the commercial bank rates were typically closely linked to the bank rate. Monetary control was

deemed to operate indirectly through the slowing of the demand for money, with an estimated lag for its ultimate effect on inflation of over twelve months (e.g. Stals, 1995a).

Pre-announced monetary target ranges, which by then had already been abandoned by the UK and US, were used from 1986 for a broad definition of money (M3), following recommendations of the de Kock Commission (1985). Target ranges were set annually using a three-month moving average of broad money growth, and were announced in the March Budget to cover the period from the fourth quarter of the previous year to the fourth quarter of the current year. The setting of the target aimed both to accommodate projected real GDP growth and to contain inflation**,** though the procedure used to choose the target was not transparent. As with the Bundesbank (Clarida and Gertler, 1997), these targets were intended as guidelines, rather than strict rules. The SARB had discretion to breach targets, for instance in the face of external trade and financial shocks. There was no penalty for breaching targets; nor was there a legally required public explanation when breaching targets (as for the Bundesbank).

Any usefulness of these targets was sharply diminished by extensive financial liberalisation beginning in the 1980s and larger capital flows from 1994. From 1990, the guidelines[3] were supplemented by an eclectic set of indicators, including the exchange rate, asset prices, output gap, balance of payments, wage settlements, total credit extension, and the fiscal stance (Stals, 1997). Such indicators probably played a role in earlier years, but the weights applied to them were not revealed. Policy was very opaque in this period, and this diminished the accountability of the SARB. For instance, policy actions during 1996 and 1998 were sometimes highly questionable, and costly both to the fiscus and to economic growth.

Aron and Muellbauer (2002b) use extended Taylor Rule models (Taylor, 1993) to try to estimate the weights applied to different policy objectives in the interest rate rule during 1986-97. Simple Taylor rules, even when augmented for foreign interest rate influences and interest rate smoothing, and based either on forecast, or actual, inflation and output gap measures, poorly describe the behaviour of the discount rate. A satisfactory model requires inclusion of the deviation of money growth from target in the rule, and controlling for extensive financial liberalisation. In practice, the central bank emphasised *current* inflation (with a low weight on the output gap), despite claiming to focus largely on money growth targeting. The weight attached to inflation is in the region of 0.8 to 1.1, well below that found for policy rules in other countries.[4]

[3] In 1990, the term "money supply targets" was replaced by "money supply guidelines".
[4] For a range of countries, Clarida et al (1998) found values for of 1 or higher in the post 1979 period (e.g. the weight is 1.8 for the Federal Reserve, 2 for Japan and 1.3 for the Bundesbank).

A third system of monetary accommodation was introduced from March 1998, with the repurchase (repo) interest rate being market-determined in daily tenders of liquidity through *repurchase transactions*. A full provision of the estimated daily liquidity requirement of banks indicated a neutral position on the part of the SARB, while marginal over- or under-provision signalled a preference for stabilising the repo rate at prevailing levels (Stals, 1999). Significant over- or under-provision of liquidity signalled a preference for movement in the repo rate.

Auctions with a predetermined fixed interest rate were used in the early days of the new system, which fix was discontinued in early 2000. Initially, there was little difference in interest rate behaviour between the second two regimes: even under price auctioning, the commercial banks collectively remained heavily influenced by SARB-directed preferences for the level of the interest rate. With a poorly functioning money market, dominated by a few large banks, rates proved inflexible and the interbank market did not always clear effectively. Various changes to the system were instituted from September, 2001, and in May, 2005[5], and helped increase participation in the market. The spread between the repo rate and interbank call rate was altered in September with a 100 basis point fall in the repo rate (a "technical adjustment"). The repo rate is now fixed to eliminate any ambiguity about SARB policy signals. Daily auctions have been replaced by weekly repurchase auctions with a seven day maturity, and the amounts allotted are announced after the tender, rather than before, as previously. Since May, 2005, an estimate of the average daily market liquidity requirement is announced prior to the auction to assist tendering. Further types of auctions may be held at the SARB's discretion to accommodate liquidity requirements and stabilize interbank rates. A daily benchmark is provided by the SARB for money market interest rates.

2.2 Inflation targeting

The adoption of inflation targeting in 2000 aimed to enhance policy transparency, accountability and predictability. The system has seen several improvements with evolving institutional design since 2000 (see Van der Merwe, 2004)[6]. Currently, the inflation target aims to achieve a rate of increase in the overall consumer price index, excluding the mortgage interest cost (the so-called

[5] Information about these operational changes can be found in the *Monetary Policy Review*, October, 2001, *Quarterly Bulletin* of December, 2001 and *Quarterly Bulletin* of June, 2005.
[6] Recent research has focused on a range of other institutional design questions for inflation targeting in South Africa (e.g., du Plessis, 2002).

CPIX)[7], of between 3 and 6 percent per year. CPIX is defined for "metropolitan and urban areas", and has a wider coverage of households (80 percent) than CPI (metropolitan), with only 40 percent coverage. However, modelling and forecasting with CPIX (metropolitan and urban) is complicated by the fact that it is published back only to 1997.[8]

The target range was initially set by the Ministry of Finance, but is now set by the National Treasury (a department of the Ministry of Finance), after consultation with the SARB (in loose conformity with the Reserve Bank Act). The final government decision is reached at Cabinet level. The *Inflation Targeting Technical Committee* (ITTC) was established in 2001, with National Treasury and SARB representation, to advise on technical issues. The target has been altered several times. First announced in February, 2000, the target was an average rate of increase in CPIX of 3-6 percent per annum for the calendar year 2002. It was revised in October, 2001 to 3-6 percent for 2003 and 3-5 percent for 2004 and 2005; in October 2002, to 3-6 percent for 2004 and 3-5 percent for 2005; and in February, 2003, the target range for 2005 was increased from 3-5 percent to 3-6 percent, as a reaction to exogenous shocks. The requirement that CPIX be within the target range *on average* over the *calendar* year was altered only in November, 2003, to a *continuous* target of 3-6 percent beyond 2006. The rectification of this design fault potentially reduces the interest rate volatility that might ensue from a progressively shortening target horizon (see *Monetary Policy Review*, May, 2004, p2).

SA is a small open economy, subject to exogenous shocks which affect inflation. A sudden rise in oil prices or a drought affecting food prices may cause a deviation from the target, over which monetary policy has little immediate influence. Monetary policy can be expected to react to "second round effects", and apparent changes induced in inflationary expectations. Several early versions of an "escape" clause were designed to create more transparency about the discretion the central bank must use in these circumstances.[9] In November, 2003, the SARB in consultation with the National Treasury revised the "escape" clause for more flexibility and clarity, repackaging it as a forward-looking "explanation clause".[10]

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[7] The mortgage interest cost measures mortgage related housing costs in the CPI. Raising interest rates to counter inflationary pressures also raises the interest cost component of measured inflation. Unless excluded, this could provoke a further tightening of monetary policy.

[8] Aron and Muellbauer (2004a) construct a measure of CPIX (metropolitan) for forecasting and modeling purposes, back to 1970 on monthly data, using a consistent methodology.

[9] A letter to the Governor from the Minister of Finance at the inception of inflation targeting (but released only in June, 2001), contained an "escape clause" suggesting failure to meet the target would require a full explanation on the part of the SARB. There was an "escape clause" in the inflation targeting statement in the appendix to the MPC statement, April 6, 2000. A further clause can be found in the Medium Term Budget Policy Statement, October, 2001.

[10] "When the economy is buffeted by a supply side shock similar to those envisaged by the original escape clause that will take inflation outside the target range (e.g. an oil price shock, a drought, a natural disaster,

The process of interest rate setting can broadly be described by Svensson's recommended moderate policy of flexible and forward-looking[11] inflation targeting (Svensson et al, 2002), so coping reasonably well with supply shocks. Inflation is not controlled at the shortest possible horizon by aggressive and volatile policy, but rather at a longer horizon of two to three years. The flexible approach aims also to stabilise the business cycle and hence the output gap. In the short-term inflation may well deviate, and sometimes significantly, from the target.

3. Assessment of the SARB's view of monetary policy transmission

The current SARB view of the monetary policy transmission mechanism is cogently summarised in a two-page box in the *Monetary Policy Review* (May 2004). This is thoroughly informed by recent literature, such as Bean et al (2002). It emphasises the asset price channel via bonds, equities, the exchange rate and property prices and notes that "the role of expectations of economic agents in determining the impact of monetary policy changes is difficult to restrict to a particular channel" (in the flow chart which illustrates the channels).

This recent view is a considerable advance on the flow chart presented by Smal and de Jager (2001), chart 1, p.5. This shows a channel from the repo rate through 'money and credit' to 'inflationary expectations' to 'wages' to the inflation rate. This is the only place inflationary expectations appear in their flow chart. It is extremely restrictive to say that the only role for inflationary expectations is to influence wages, while the only influence on these expectations is money and credit. The rational expectations approach has long suggested more eclectic expectations channels.

There is evidence that wage setting in SA is quite backward-looking (Aron et al, 2003). Wages appear to be unaffected by information less than two quarters old and there is no role for expectations proxies, including forecasts of inflation rates and exchange rate changes derived from econometric models. This suggests wage negotiators take account of the state of the economy as revealed in the data of the previous quarter, and settlements come into force one

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or financial contagion affecting the currency), at the subsequent meeting of the Monetary Policy Committee, the SARB will fully inform the public of the nature of the 'shock', the anticipated impact on CPIX inflation and the monetary policy response to ensure that inflation returns to the target and the time frame over which this will occur." (Medium Term Budget Policy Statement, November 2003).

[11] The Reserve Bank appeared to practice a stricter version of inflation targeting in the early years. Expectations were heavily backward-looking, creating much persistence in inflation. Placing a higher weight on inflation stabilisation in the early years helped establish initial inflation credibility. The move toward a more flexible approach was facilitated by the institutional changes in November, 2003 (*Monetary Policy Review*, May 2004).

quarter later. Given powerful unions, able for the most part to insist on obtaining compensation for past increases in CPI, it is easy to understand why they would not want to bother with the difficult task of forecasting inflation and agreeing such forecasts with the employers. They know that they can recoup past inflation soon enough if inflation moves higher and stand to benefit from indexing to the past if inflation moves lower. If a safety margin of say 2 percent on top of the past CPI increase is built in, only rarely would their employed members suffer even a temporary fall in living standards. These empirical results point to wage settlements as being a major source of inflation inertia in SA. The implication is that bringing inflation down helps keep inflation down. However, if part of the safety margin is related to inflation volatility, one might expect more moderate wage settlements in an environment where the policy framework had succeeded in reducing inflation volatility.

Neither of the SARB reviews of monetary policy transmission mentions the cost channel, see Barth and Ramey (2001), whereby higher interest rates may raise the cost of capital for firms and households and who may try to pass these costs on. This has a special relevance in SA where the mortgage interest rate currently has a weight of 10.32 percent in the headline CPI and other interest rates also enter in a more minor way. The move to CPIX, which excludes mortgage costs, as the inflation target for the SARB was designed to give a more coherent target and to wean price setters off this mechanism whereby higher interest rates designed to reduce inflation, automatically increase CPI inflation first.

Our research on wages finds an additional short-term cost push effect from the change in the prime rate[12] on wage settlements, even when long-run indexation to CPI (incorporating mortgage costs) is taken into account. However, we also find evidence of another asset price channel sometimes omitted in discussions of monetary transmission: we find that rising house prices[13] have a positive effect on wage settlements two quarters later. Given an average lag of four quarters for house prices, it is plausible that part of the effect operates through the effect of rising house prices subsequently raising rents. Since we also show that interest rates have strong effects on house prices, this is one route by which higher rates *reduce* inflation.

The *Monetary Policy Review* (May 2004) puts considerable emphasis on the credit channel of monetary policy transmission. It is worth commenting on the role of households in this process, particularly from the point of view of European debates about institutions and monetary transmission, see Maclennan et al (1998), Cecchetti (1999) and the UK Treasury's

[12] Mortgage bond rates move almost one for one with prime rates.
[13] House prices have no role in the CPI so that finding such a role in the wage equation suggests workers perceive housing costs as part of their budget.

'Five Economic Tests' assessment for potential adoption of the Euro by the UK[14]. SA resembles the UK in that mortgage rates are primarily floating rates, rapidly responsive to movements in the repo rate; owner-occupation in the formal sector, financed by mortgage debt, is high; lenders can readily access the housing collateral of borrowers in payment default; and loan to value ratios are high. Moreover, through flexible mortgages, homeowners can readily borrow more when the value of their housing equity rises. This is in sharp contrast to much of continental Europe, Italy being the polar opposite in terms of access to credit.

In SA and the UK, rising house prices expand collateral for consumer borrowing, with large effects on consumer spending (see Bank of England's Inflation Reports, and also Aoki et al (2002)). Aron and Muellbauer (2000a,b, 2006a) estimated a long-run propensity to spend for SA out of housing wealth of between 7 and 10 percent. This implies that a 10 percent rise in real house prices[15] would raise consumption by 0.6-0.9 percent. Given the rapid transmission from the repo rate to the mortgage bond rate, and powerful effects from the latter onto house prices and so housing wealth and consumption, it is not surprising to find powerful monetary policy transmission in SA. Understanding the mechanics of the household part of the channel, of which the housing wealth element is only a part, can suggest other policy interventions or institutional changes that might offset or stabilise part of this mechanism (see section 7).

One other remark about monetary transmission is in order. It is often said that monetary policy has no effect on output in the long-run. However, there is a large body of economic theory suggesting that high uncertainty impedes investment and considerable empirical evidence of a negative link from inflation volatility to growth (e.g., Judson and Orphanides, 1996; Aron and Muellbauer, 2005). If a change in the monetary policy regime can bring about a lowering of volatility and uncertainty, there could be important benefits for growth, productivity and welfare in the long run. The SARB in its communications could do more to embed the case for a monetary policy regime that aims to reduce uncertainty, because of these long-run output and welfare benefits. The poor, with few assets or access to credit to cushion them from inflation shocks, are likely to be amongst the biggest beneficiaries of a less volatile inflation environment.

4. Transparency, credibility and predictability of monetary policy

[14] *Housing, Consumption and EMU*, HM Treasury, 2003

[15] Housing wealth and other liquid and illiquid wealth measures were constructed in Aron and Muellbauer (2006b). Housing wealth is measured as the real stock of housing multiplied by the real house price index. In the short-run, as the stock changes slowly, housing wealth can be approximated by the change in real house prices. It could, however, represent consumer confidence as well as wealth or collateral.

4.1 How transparent is the South African Reserve Bank?

The last decade has seen a trend towards governments granting independence to central banks, and requiring accountability for their actions. Improved accountability has been facilitated by a parallel trend towards greater transparency and openness of central banks. This enhanced transparency to the public may also serve to protect the independence of central banks (Blinder et al., 2001). Recent economic thinking suggests that greater transparency of policy may also influence the *effectiveness* of monetary policy. Anchoring agents' inflationary expectations around a credible target facilitates a more moderate approach to shocks by the central bank as agents will discount short-term volatility. By increasing the predictability of interest rate policy, market interest rate volatility is reduced, lowering uncertainty in the economy.

Consequently, central banks that have adopted inflation targeting have placed a premium on transparent monetary policy - defined as the disclosure of information about monetary policy. Theoretical and empirical evidence on central bank transparency has recently been surveyed by Geraats (2002). Eijffinger and Geraats (2006) outline a framework to assess the different channels of transparency, organised by political, economic, procedural, policy and operational aspects of central banking. Objective information[16] disclosure by central banks was used to score the five channels, creating a total transparency index, and was applied to nine OECD countries[17]. Their method encompasses and improves on approaches in the earlier literature.

Central bank transparency in developing and emerging market countries has never been explored in this manner. We report the Geraats central bank transparency index for the SARB under Mboweni in 2004 and under Stals in early 1994, to show how transparency has changed with the adoption and development of the inflation targeting system. The results are shown in Table 3. Sources for the South African scores are given in Appendix 1, together with the survey questions. This facilitates comparison with transparency indexes calculated in 2002 for Australia, New Zealand and the UK (Eijffinger and Geraats, 2006).

Central bank transparency in SA has improved greatly under inflation targeting, from a score of 5 in 1994, to 9 in 2004 (out of a possible 15). The score for the SARB will improve

[16] The measures capture *behaviour,* and hence are not subject to the criticism of the literature on *de jure* measures of central bank independence that are based on statutes.

[17] There are three questions for each of the five aspects of transparency, with equal weight and a maximum score of one. Scores were assigned by surveying available information on websites and in published government and central bank documents. The five sub-indexes, each based on the respective three questions, were summed to obtain an overall index.

further as the institutional design of the system matures (for instance, if the model is published, the score will rise to 10). The scores are based on available information, and can be verified.

The Bank of England and Reserve Bank of New Zealand offer benchmarks for high transparency in targeting systems with accumulated experience. The Reserve Bank of Australia's score is on a par with that of the SARB. *Political* transparency gains the full score for the SARB. *Policy* and *operational* transparency gain 2 out of 3 respectively. The score is lowest at 1 out of a possible 3 for the specific categories of *economic* transparency and *procedural* transparency.

While the categorization of transparency above is systematic and objective, the *weighting* given to the different categories is subjective, and may also depend on the state of development of the economy. With the equal weighting of Eijffinger-Geraats, we find transparency (and hence accountability[18]) could be improved by: publishing the macro-econometric model; publishing more detailed economic forecasts and annual evaluations of forecast errors; publishing (non-attributed) minutes of Monetary Policy Committee (MPC) meetings; giving a more detailed assessment of future economic conditions in the MPC's monetary policy statement; and explicit future policy inclinations in MPC statements. The last of these remains controversial, since it may reduce flexibility in responding to new information. Currently forecasts are based on the constant interest rate assumption. Scenarios with a forecast interest path, as pioneered in New Zealand, may meet the objective of enhancing predictability of future interest rate policy (Svensson, 2001; Svensson et al, 2002). However, Goodhart (2005) argues that if an MPC's non-constant forecast were to be published, it might be regarded by the public as more of a *commitment* than a uncertain forecast; and it might influence the private sector's forecasts by more than its own uncertainty warranted (see also Morris and Shin, 2004).

We present two other possible weightings in Table 3, one suggested by Mr. Plenderleith, formerly of the MPC of the SARB, and the other derived by us from a different weighting system used by Mahadeva and Sterne (2000). The normalized scores show that SA's relative transparency improves under both.

4.2 Has monetary policy become more credible?

[18] The Reserve Bank Act (1989) required the publication of monthly statements of assets and liabilities and submission of an annual report to Parliament, and, periodically, for the Governor to appear before the Standing Committee on Finance. This continues (the parliamentary assessment is now televised), but there is now more detailed information by which to hold the SARB accountable.

If economic agents believe that the central bank will achieve its inflation target, their inflation expectations are more likely to be *anchored* around the inflation target, and price and wage setting will be far less responsive to *temporary* fluctuations in inflation, creating stability. The cost of expectations not being anchored to the target is that a more aggressive monetary policy may be required to gain credibility for the central bank in its price stabilising goal.

In principle, examining the evolution of inflation expectations before and after the adoption of inflation targeting could reveal whether there has been convergence to the target - or equivalently, whether monetary policy is credible to agents. If expectations with the *same* forecast horizon enter the target range over time, this is a necessary condition for convergence, but it is not sufficient. It could be a lucky accident e.g., if expectations were purely backward-looking and inflation fell due to globally lower inflation, or if a terms of trade shock appreciated the currency.

We examine the new survey of inflation expectations[19] from the Bureau of Economic Research (BER) (Kershoff, 2000; Kershoff et al, 1999). The survey asks households, trade unions, businesses and financial analysts what their expectations are of average CPIX and of average CPI inflation in the forthcoming calendar year and for the year thereafter. A "reference rate" is given to the participants on the survey form, which will influence the survey responses, see Kershoff (2000), p12.[20] Participants are asked for their expectations for the current and following calendar years, and thus the expectations horizon *shortens* for each consecutive quarterly survey in the year.

We achieve a constant horizon[21] by examining expectations for the *same* quarter for each year. Two graphs are shown for CPIX inflation expectations one year ahead, surveyed in the third quarter of each year (Figure 2).[22] The top graph shows the *expected inflation* of three different types of agents[23] as well as the average over them. Expectations have come within the target range, and the different agents' expectations have converged on the analysts' arguably better-informed view. This is encouraging evidence for monetary policy credibility.

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[19] There are no inflation expectations surveys available before targeting began. The monthly Reuters survey, which presents analysts' inflation expectations at various ranges ahead, also begins only in 2000. We have not analysed wage settlements before and during the inflation targeting regime. (Levy and Associates publish information on wage settlement levels, and the SARB refers to these findings.)

[20] For instance, surveys in 2004 give the average rate of inflation for 2003 and an average for 1999-2003.

[21] Other analyses of the trends of these expectations (Wesso and Kock, 2003; and the SARB's *Monetary Policy Review*) have not explicitly tried to control for this factor.

[22] In order to utilise all the information in this short data set, we have chosen the *third* quarter in Figure 3 because it is the first quarter used in the survey in its first year, 2000 and is also available in 2005.

[23] The BER *household* expectations data (not considered here) for a 12-month ahead view of CPI inflation are problematic e.g., because of widespread illiteracy, see Kershoff (2000). The data suggest households' inflation expectations substantially exceed those of the analysts and indeed, recorded CPI inflation.

Further encouragement comes from the graph below which shows these expectations minus the relevant reference rate, a simple proxy for the backward-looking element of expectations[24]. Values of less than zero on this graph indicate successful reduction of inflation expectations, since expected inflation falls below previously experienced inflation. Ultimately, if inflation targeting is successful in bringing down inflation expectations, we expect an oscillation around zero. Thus, successful convergence to credible policy would be seen in negative values for a period, followed by a rise towards zero. This indeed is what we find, most of all for the analysts. The average value of the expected inflation shift for the analysts was strongly negative between 2000 and 2004, both for the one-year and the two-year ahead horizons (the latter are not shown). Analysts were convinced that inflation would decline, despite the set-back in 2002 following the Rand crisis

For trade unions and the business sector, the deviation of expected inflation from the reference rate becomes negative only in 2003-4 suggesting confidence in the new monetary policy regime took longer to develop. By 2005, one can argue that full convergence had been achieved for all observers, though analysts (and others) apparently thought the low reference rate of 4.3 percent was not sustainable a year ahead in the light of new information.

Another way of gauging inflation expectations is by looking at the spread between index-linked bonds and other domestic bonds of a similar maturity structure (Figure 3). However, interpretation of these trends in terms solely of credibility is problematic. The yield differential is a function of the expected inflation rate over the horizon, but also of inflation risk. With the maturity period constantly decreasing, such risk obviously will fall, reducing the spread. Further, a high demand for a small issue of bonds will affect the perceived liquidity of the bond and drive down the yield. In Figure 3, the break-even rates shown are largely within the target from early 2003. If there is a sharp change over a *short* period this would be indicative of changed expectations - assuming little change in the perceived liquidity of the bonds. However, for longer periods, little can be deduced about increased credibility of monetary policy, unless an adjustment is made for maturity and shifts in liquidity. Further, expectations may be largely backward-looking, so that spreads may fall in the target range simply because of exogenous events.

4.3 Market anticipation of interest-rate decisions

[24] This does not in fact sufficiently correct for recent information. For instance, in the third quarter of 2004, while the reference rate of average inflation in 2003 will have a bearing on the inflation expectation, so too will more recent information e.g., the June, 2003 to June, 2004 annual inflation rate. This is especially likely to be the case for the well-informed agents (e.g. the analysts).

Proper communication by the central bank about the factors that explain policy should improve the predictability of monetary policy. More predictable interest rates signal that the central bank's policy rule is well understood, and there is little asymmetric information between central bank and the private sector. If the volatility of market rates is thereby lowered, this reduces uncertainty in financial markets and the real economy, encouraging investment (Aron and Muellbauer, 2005).

Predictability by market analysts

The shift in market rates due to interest rate decisions by the central bank is termed the "surprise factor": a large shift indicates the market has not fully anticipated the decision. The predictability of interest rates under inflation targeting was assessed using monthly Reuters data on analysts' interest rate forecasts, beginning in 2000.[25] We used the shortest available prediction periods by market analysts of the prime market rate. One, two and three month ahead forecasts of the end of quarter prime rate are compared to the realised prime and repo rates in Figure 4. This shows, for each quarter, how the expectations of the end of quarter interest rate compared with the actual outcome, and how they evolved over three months, in the light both of repo rate decisions and economic news. The top graph shows the actual forecasts for the end of each quarter. The graph beneath shows the analysts' prediction errors or "surprises".

The predictions have a maximum error of about 1.25 percent (and usually far less).[26] The "surprise factor" has been greater for SA than some other targeting countries such as Australia, New Zealand, Norway and the UK (Bernhardsen and Kloster (2002), p 55). However, this is mainly due to the larger size of repo rate adjustment, reflecting a higher and more volatile inflation rate in SA. When adjustments of 25 basis points become the norm, with lower and less volatile inflation, smaller surprises will occur.

A striking finding is that the new monetary framework appeared to be well-embedded in interest rate expectations by the end of 2001. Between the 1st September and 31st December, 2001, the Rand depreciated by 42 percent against the US Dollar (daily data). The Reuters survey reveals that the prime rate at the end of March, 2002 was around 1.25 percent higher than expected in the December, 2001 survey; 0.8 percent higher than expected in the January, 2002

[25] The Reuters data are unfortunately somewhat noisy being based on a small sample of analysts.
[26] Due to a technical adjustment in the repo rate on 4 September, 2001 (Table 4), the blip in the graph will overstate any surprise.

survey[27]; and around 0.2 percent higher than expected in the February, 2002 survey. The implication is that the MPC raised rates *more sharply* than the market expected (positive errors), mainly because of unexpected inflation rises between December and March. However, had the market expected interest rate setting behaviour of the Stals-type, there would have been large negative forecasting errors.

Predictability by market traders

A recent study uses daily data on forward rate interest agreements (FRAs)[28] at various horizons, to examine whether market traders correctly predict SARB interest rate decisions before each MPC meeting (Ballim and Moolman, 2005). The authors reproduce the technique of Roley and Sellon (1995), and others, for South African data. The daily FRA data have the advantage over the monthly Reuters expectations data in controlling for news at a much shorter horizon. The following regression was run

$$\Delta \boldsymbol{R}_{i,t} = \alpha_i + \beta_i \ \Delta r_t + e_{i,t} \qquad i = 1,2 \tag{4.1}$$

where α_i is the estimated constant and β_i is the estimated coefficient in regression i, Δr_t represents the change in SARB's repo rate, and e_i is the error term. While four regressions were run in this study, we are interested primarily in two of these, where $\Delta R_{1,t}$ is the change in market interest rate from the day following the previous MPC meeting at time t-1 to the day preceding the current meeting at time t, denoted "*before*"; and $\Delta R_{2,t}$ is the change in the closing market interest rate on the day preceding the current MPC meeting to the close on the meeting day, at time t, denoted "*on*". Results were reported for 3-monthly FRA agreements in 3-months' time, 6-months' time, 9-months' time and 12-months' time (respectively called 3x6-month, 6x9-month, 9x12-month and 12x15-month FRAs). Most of the movement in market rates occurs in anticipation of policy action[29], rather than on the day of the event[30] or the day after.

[27] This forecast took into account new information from a special MPC meeting in January, 2002, when the repo rate was raised to 10.5 percent (Table 4).
[28] A Forward Rate Agreement (FRA) is an agreement between two parties to set future borrowing rates in advance.
[29] The β_i (*before*) are 0.708 for the 3x6 FRA; 0.709 for the 6x9 FRA; 0.612 for the 9x12 FRA; and 0.578 for the 12x15 FRA, all significant at the 1 percent level.
[30] The β_i (*on*) are 0.245 for the 3x6 FRA; 0.222 for the 6x9 FRA; 0.186 for the 9x12 FRA; and 0.151 for the 12x15 FRA, all significant at least at the 5 percent level.

However, to evaluate expectations, shorter duration FRAs than reported by these authors are probably more appropriate. If the MPC meetings are approximately 6 weekly, the 1x4 FRA (a 3-month interest rate in one month's time) does not quite cover the period, while the 3x6 FRA in effect incorporates expectations of two meetings. The frequency of meetings has varied, but gaps have seldom exceeded 2 months (see Table 4). The 2x5 FRA data (a 3-month interest rate in two months' time) is more suitable than either the 1x4 or 3x6 FRAs.

We report results for two samples for the 1x4 and 2x5 FRAs - both absent from the earlier study - and for other maturities over the yield curve (Table 5). The samples begin with the first MPC meeting (2 March, 2000), and respectively run to the end of 2004, and the end of June 2006. For all maturities over both samples, but particularly for the 1x4 and 2x5 regressions, there is a significant and sizeable coefficient in the "before" regressions. Thus, much of the change in market rates between the MPC meetings is explained by the change in the repo rate at the next MPC meeting. The far smaller but significant coefficients for the "on" regression (4.5 times smaller for the case of the 2x5 FRA), indicates there is some uncertainty in the day preceding the decision, but also allows for other "news" on the day of the decision.[31] One cannot draw a robust conclusion about the scope for improvements in monetary policy transparency and hence predictability from the significant "on" coefficients, as Ballim and Moolman do. However, a comparison of the "before" to "on" ratios with US interest rates for equivalent maturities and characteristics, could give some insight into *relative* predictability.

Ballim and Moolman do not report the standard errors of their equations, or focus on the prediction errors of the market traders. Average standard errors are given in Table 5, while Figure 5 illustrates the residuals for the "before" regression for the 1x4, 2x5 and 3x6 FRAs. The key finding is that the market traders usually make smaller errors than the market analysts above, as one would expect from daily data (which give smaller scope for news to feed into errors). The small errors in the November, 2001 to September, 2002 period, following the currency depreciation, confirm how well-embedded the new monetary framework had become.

5. The performance of monetary policy

5.1 Evaluating the forecast errors of the SARB

[31] Our results are similar to those of Ballim and Moolman (2005) for their chosen sample up to the end of October, 2005. However, we cover 37 MPC meetings from the start of inflation targeting to the end of October, 2005 (excluding the technical adjustment meeting, see Table 4), while Ballim and Moolman count 36 meetings, excluding the June 2000 meeting in error (communication).

The emphasis of the modelling activities in the SARB has shifted away from the maintenance of a single large-scale macroeconomic model towards a more compact or core model, supplemented by other models.[32] The new models are not published. Only inflation forecasts are published[33], in the form of fan-charts (e.g. none of output). The past forecast errors of these models are not evaluated. Table 3 shows that these facts lower the SARB's *economic* transparency score. It is not possible to judge forecasting and modeling without access to published models. We have attempted a crude analysis of the SARB's forecast errors using the fan-charts.[34] Table 6 shows the size of errors both one year ahead and two years ahead for each of the fan-charts.

The March, 2001 forecast somewhat underestimated the decline in inflation in 2001Q2 and Q3, but completely failed to forecast the rise in 2002 (a forecast error of 5 percentage points). The latter is quite understandable: nobody in March, 2001 could have forecast the extent of the collapse of the Rand at the end of 2001 and of the rise in maize prices. In October, 2001, supposedly based on data only up to 2001Q1 (though the report discusses data up to August), the forecast for 2002Q1 was 5.9 percent against an out-turn of 7.0 percent, and 6.0 percent for 2003Q1 against an out-turn of 9.6 percent. Again, the imminent depreciation of the Rand and food price rises would have been hard to foresee.

In April, 2002, supposedly based on data up to 2001Q3 (but referring to data up to February 2002), the forecast for 2002Q3 was revised up to 8.1 percent, against an outcome of 10.2 percent. This was not an impressive achievement given that the exchange rate and food price shocks now lay some months behind, and given the Bank's own excellent analysis of the role of maize prices published with this report. One extenuating circumstance was the error by *Statistics South Africa* in reported inflation which resulted in inflation being more and more over-estimated between February 2002 and March 2003. This could explain only a small part of the forecast error, however. The two-year ahead forecast for 2003Q3 of 5.3 percent against an out-turn of 6.1 percent was very creditable in the circumstances, in which inflation expectations and price and wage setting behaviour up to May, 2003 would have been affected by the data error.

In October, 2002, based on quarterly data up to 2002Q2, the forecast for 2003Q2 of 6.4 percent, compares with an outcome of 7.6 percent, overestimated the speed with which inflation was to fall after the exchange rate and food price shocks. This could be consistent with omitted

[32] The SARB's suite of models apparently comprises a core model, a small-scale model, vector autoregressive models, Phillips-curve models and a monthly disaggregated forecasting model (Van der Merwe, 2004).
[33] Forecasts are conditional: but private sector economists have complained about the lack of information on the assumptions (e.g. of oil prices, the exchange rate and degree of pass-through).
[34] The central forecasts are not published in numerical form, and we have estimated them from the pictures.

factors in the forecasting model implying greater persistence. By contrast, the forecast for 2004Q2, of 5.2 percent, overstated the actual rate of 4.7 percent.

In March, 2003, based on quarterly data up to 2002Q4, the forecast for 2003Q4 was 5.7 percent compared with the actual of 4.2 percent, while that for 2004Q4 was 5.7 percent compared with the actual of 4.4 percent. Some of the overestimate of forecast inflation was surely due to *Statistics South Africa*'s overestimate of actual inflation of 1.4 percent for CPIX for 2004Q4. In October, 2003 based on quarterly data up to 2003Q2, incorporating the corrections released by *Statistics South Africa*, the forecast for 2004Q2 was 4.5 percent compared with an out-turn of 4.7 percent, the best of the one year ahead forecasts made so far. The two year ahead forecast underestimated the fall in inflation. This may be linked to an underestimate of the strength of the real Rand, and moderate global inflation. In May 2004, based on quarterly data up to 2003Q4, but incorporating data for January and February, 2004, both the one year and two year ahead inflation were overestimated. The overestimates persisted in the one year ahead forecasts in November 2004 and May, 2005, though the errors declined.

5.2 How has monetary policy reacted to external and domestic shocks?

The Stals ANC era: 1994q2-1999q1

Following elections in April, 1994, the new government was committed to a long-term development strategy for generating rapid and widely-shared growth in two highly publicised programmes[35]. Post-election growth performance proved disappointing, after an initial upturn. Real annual GDP growth averaged 0.5 percent in 1998 and 2.4 percent in 1997, compared to 4.2 and 3.1 percent in 1996 and 1995, respectively. Apart from SA's labour market inflexibility, increased trade competition and a declining gold price from late 1996, probably the most important factor impeding growth was high real interest rates (Aron and Muellbauer, 2002a).

Capital inflows increased markedly after the elections, though from a low base following a decade of financial sanctions. Flows, particularly short-term flows, accelerated with the lifting of exchange controls on non-residents in March, 1995, after the dual exchange rate system was unified. These structural shifts implied a transition to a new "permanent" or long-run equilibrium

[35] The broad goals of the earlier Reconstruction and Development Programme (RDP), were reinforced by the Government's Growth, Employment and Redistribution strategy (GEAR), announced in June 1996.

level of inflows. The change from negligible flows to a new sustainable level of inflows, for given capital and trade controls, required adjustment via a more appreciated real exchange rate.

Aron and Elbadawi (1999) argue that the SARB had dual policy objectives from April, 1994 until the first currency crisis in February, 1996: to contain inflation through an interest rate policy based on explicit monetary targets; and to stabilise the nominal exchange rate by preventing appreciation of the currency.[36] Despite large and persistent currency interventions, the SARB claimed the Rand was floating and that intervention was to smooth temporary and reversible short-term fluctuations (Stals, 1995b). However, during the 21 months from the elections, the nominal bilateral rand/dollar exchange rate moved by no more than 2 percent from R3.65/$, while in April, 1995 to January, 1996, the range was even narrower, moving in an "implicit" band of R3.65±1 percent. The steady bilateral rate in the face of huge net capital inflows was viewed by many investors as an implicit, "one-sided" nominal target (e.g. Union Bank of Switzerland, February, 1996).

With an open capital account and persistent capital flows, a *policy trade-off* arises where sustaining an exchange rate "target" may occur at the expense of higher inflation, higher interest rates and eventually reduced output (e.g. Obstfeld, 1996)**.** Heavy unsterilised intervention in the market occurred at the expense of monetary targets (Stals, 1995b) - sterilisation of the effects of the reserve accumulation began only late in 1994. Private sector credit grew strongly. Deviations of money growth from target growth zones and persistent overshooting from 1994 onwards are evident in Figure 6. Monetary policy was tightened considerably, attracting even more inflows.

The exchange rate intervention was clearly unsustainable. Foreign investors anticipated a significant relaxation of domestic exchange controls at the Budget in early March, 1996, to help Stals combat the appreciation. In the event, the intended decontrol package was put on hold until July, 1997. However, the currency crisis was well underway by mid-February, and the bilateral Rand had depreciated 20 percent by late April. The SARB intervened massively to avoid depreciation of the currency. Of a net cumulative intervention of US$5.3 billion (mid-February to the end of April), about US$3.5 billion occurred via the forward market (CREFSA, 1996).

Later crises occurred in October, 1996, November, 1997 and April, 1998, triggered largely by contagion effects from the Asian crisis (and declining prices of gold and other metals). The prime rate rose to 20.25 percent after the first crisis, and remained at that level until the end of 1997, falling to 18.25 percent just prior to the April, 1998 crisis, when it rose as high as 25.5

[36] Subsidiary goals were to withdraw from the forward foreign exchange market, and to accumulate foreign reserves (Stals, August, 1994).

percent (Figure 7). With inflation averaging just over 6 percent in 1998, this implied very high real interest rates.

Heavy intervention in the forward market drove the Net Open Forward Position (NOFP)[37] from $12 billion to $23 billion between April and August, 1998 - a change equivalent to about 8 percent of GDP - but had little success in stemming the fall of the Rand. The Australian dollar experienced a similar large fall at the same time, because of common terms of trade influences and the expected impact on Australian exports of lower demand due to the Asian crisis. By contrast with the SARB, the Australian Reserve Bank left interest rates unchanged, believing that with slow pass-through from the exchange rate to consumer prices, and with the deflationary terms of trade and demand shocks, no rise in interest rates was necessary. The Australian economy passed through this period with inflation and growth little affected – in contrast to SA, which suffered a serious decline in growth. Caballero et al (2004) have drawn a similar unfavourable contrast between Chile's sharp rise in interest rates in 1998 and Australian policy.

Inflation targeting under Mboweni: 1999q3-2004q2

Mboweni's Governorship began in mid-1999 and inflation targeting in February, 2000. There followed an eighteen month period of stasis in nominal interest rates and relative stability in real interest rates (Figures 8 and 9). The variable repo rate announced at around 12 percent in the first MPC meeting in October, 1999 was still around this level in May, 2001 (Table 4). The static monetary policy stance presumably aimed to stabilise inflationary expectations in the early stages of the targeting regime, in the face of sharply rising international oil prices from early 1999 (rising from $10 to over $30 a barrel by September, 2000), and rising international interest rates. The targeted CPIX consequently rose modestly with food and other transport-dependent components. The exchange rate reversed its appreciating trend in both real (Figure 7) and nominal (Figure 8) terms, which had helped to reduce the NOFP from around $21 billion in March, 1999 to $10 billion by April, 2000. The 25 basis point rise in an unscheduled meeting of October 2000 (then maintained until June, 2001) was a steady response to the anticipated second round effects of external shocks.[38]

The most challenging episode to face the MPC since the beginning of inflation targeting began in 2001Q4. Given the information available at the time, their interest rate responses in the

[37] The NOFP is the uncovered part of the oversold forward book: NOFP = (forward purchases of $ – forward sales of $) + net international reserves (excluding gold).
[38] There was no impact on the prime rate, as for cost reasons the commercial banks generally do not act on 25 basis point changes.

aftermath are hard to fault. As the *Monetary Policy Review,* October, 2001 explains, by July, annual CPIX inflation had come down close to the 6 percent top of the target range, and was expected to fall below that level by 2002. Indeed based on quarterly averages, the annual CPIX measure of inflation had fallen to 5.9 percent in 2001Q2, within the target range. The US economy suffered a sharp slowdown[39], and global stock markets and economic activity also declined. There were signs of deflationary forces in declining oil and other commodity prices and in foreign producer price indices. Short-term interest rates in industrial countries fell sharply, most dramatically in the US, and further falls had occurred after the 11th September attacks in New York. The repo rate in SA was reduced by 100 basis points in June, by 100 basis points on 4th September (a technical adjustment leaving market rates unchanged) and 50 basis points on 20th September to 9.5 percent. Given the concomitant fall in rates abroad, the interest differential did not narrow.

However, between 1st September and 31st December, 2001, the Rand depreciated by 42 percent against the US Dollar. This was a substantial set-back for the long-term aim of progressively reducing the inflation rate in SA. Much has been written about the causes of this episode, including the voluminous report of the Myburgh Commission (2002). However, to put the episode into perspective, on quarterly averages of the nominal effective exchange rate, the quarterly depreciation rate was 20 percent in 2001Q4, and 11 percent in 2002Q1. One can obtain estimates of what part of these depreciations can be regarded as unexplained shocks from differenced vector autoregressive (VAR) models[40]. The results suggest that as little as 11 of the 20 percent depreciation in 2001Q4 and as little as 3 of the 11 percent in 2002Q1 (i.e. about half of the depreciation over two quarters), cannot be explained in terms of standard variables including gold price changes, foreign inflation, interest rates, domestic inflation rates and the output gap.

Our own interpretation of the unexplained shock in 2001 agrees with many financial market participants giving evidence to the Myburgh Commission, who put the main emphasis on two factors. The first is the market perception that the well-signalled intention of the SARB to shrink the NOFP had created the impression of a 'one-way bet' in terms of currency depreciation. The second is the tightening of foreign exchange regulations in October, 2001, which resulted in a

[39] The NBER business cycle dating committee later declared that March, 2001 marked the beginning of a technical recession.

[40] We estimated VAR models on quarterly data, consisting of eight variables: oil price or gold price inflation, the output gap, exchange rate change, import price inflation, PPI inflation, CPI inflation, short-term interest rate, and money growth. The reduced form residuals from the VAR are orthogonalized using a Cholesky decomposition to identify the structural shocks, where the variables are in the order given above (see also, McCarthy, 2000). With such rich specifications, there is some risk of over-fitting, which may under-estimate the size of unexplained shocks.

sharp reduction in liquidity in the foreign exchange market. In thin markets, volatility is likely to increase, and with the perception of the 'one-way bet', this took the form of a sharp fall in the value of the Rand. Evidence for the liquidity reduction comes in two forms. First, the sharp rise in buy-sell spreads in the forward market after the tightening of regulations was announced. Second, on the SARB's own evidence, higher foreign exchange volatility had, in the past, almost always been associated with higher trading volumes. However, volumes shrank in October to December, 2001, signalling a liquidity problem[41].

We now examine the inflationary implications of these shocks. Estimates of pass-through from exchange rate shocks to CPIX in the VAR models, suggest a cumulative effect on CPIX of around 10 percent after 4 quarters and 15 percent after 7 quarters. Taking the fourth quarter 'exogenous shock' to be 11 percent, and the 2002Q1 shock to be 3 percent (see above), such pass-through models predict that the level of CPIX by 2002Q4 would be around 1.3 percent higher and by 2003Q4, 2.1 percent higher, than if these shocks had not occurred. The actual rise in inflation by 2002Q4 was far greater than 1.3 percentage points. Defined in 4-quarter changes of seasonally adjusted quarterly data, CPIX inflation was 6.2 percent in 2001Q4, and peaked at 11.1 percent in 2002Q4 (though on the erroneous data the peak was thought to be 12.5 percent).

Another important reason for the rise in inflation was the rise in food prices, led by maize prices, cogently explained in the *Monetary Policy Review*, April, 2002, p.8-10. Regional droughts, the farming crisis in Zimbabwe and the switch to higher import parity prices with regional excess demand were the main factors, which were then exacerbated by the fall in the Rand. Without the food price component, CPIX inflation would have been more than 2 percentage points lower in the second half of 2002 than with food prices included, though this is likely to understate the contribution of food prices to the rise in inflation.[42]

A third significant factor in the rise in inflation, even when subsequently corrected for, was *Statistics South Africa*'s rent measurement error, due to the upward bias in inflation perceptions it created (*Monetary Policy Review*, November, 2003, p.2-3). In May, 2003 *Statistics South Africa* revised down the 12 month CPI and CPIX inflation rates for March, 2003, by 2.3 and 1.9 percentage points respectively. On quarterly average data, the annual CPIX and CPI inflation rates for 2002Q4 were revised down by 1.4 percentage points in 2002Q3 down by 0.9

[41] Bhundia and Ricci (2005) place more weight on unspecified nominal shocks and cite "the acceleration of money supply growth from around mid-2001" as a potential source of such shocks (p.166). However, the money stock data were distorted by the restructuring of De Beers and the Anglo American Corporation, while amongst other factors, the private sector's liquidity preference was increased through greater precautionary and speculative demand for money (*Quarterly Bulletin*, March 2002 p.38-9).

[42] This is due to neglecting the effect of higher food prices on other prices and on inflationary expectations.

percentage points and for 2002Q2 down by 0.6 percentage points.[43] Thus, averaging for the 4 quarters 2002Q2 to 2003Q1, CPIX inflation was overstated by around 1.2 percentage points and CPI inflation by a little more. It is likely that price setters and wage negotiators used the upward biased inflation data in making their decisions, so contributing to higher inflation.

The contrast with the interest rate response to exchange rate depreciation in 1998 under Stals is striking. The MPC raised the repo rate from 9.5 to 10.5 percent at a special meeting in January, 2002, a very moderate response to the turmoil on the foreign exchange market; and to 11.5 in March, 12.5 in June and 13.5 percent in September, a level sustained until June, 2003. Given the SARB's inflation forecasts shown in Table 6, one can measure the monetary policy stance in terms of the real repo rate at around 5.5 percent in March 2001, 3.6 in October 2001, 3.4 in April 2002, 7.1 in October 2002, 7.8 in March 2003 and 4.0 percent in October 2003, suggesting policy was tightest from about mid-2002 to mid-2003.

Real GDP growth averaged over 3.5 percent per annum from the second half of 1999 to the end of 2002, despite recessionary world economic conditions. During 2003 growth slowed sharply, partly for global economic reasons with the imminent invasion of Iraq, and partly because real interest rates were held at relatively high levels in the second half of 2002 and the first half of 2003. Keeping the repo rate at 13.5 from September 2002 to February 2003 seems understandable in view of the inflation surge, peaking at 14.3 percent in 12 month rates on CPI and 12.7 percent on CPIX in October 2002 (on the erroneous inflation data).

The March 2003 decision to maintain the rate is harder to understand, however, given that the SARB's inflation forecasts in March 2003 were 5.7 percent for both the end of 2003 and the end of 2004 (Table 6), implying a tightening of policy, raising the one-year ahead real repo rate to 7.8 percent. Moreover, the effective exchange rate had strongly recovered over 6 months, mainly due to sustained increases in commodity prices; inflation had already fallen; and the SARB had recently become aware of a likely overstatement in the inflation data, though not of its precise magnitude. Stopford's revelation of the overstatement of inflation in *Statistics South Africa's* data was made public in April (Stopford, 2003). Uncertainty concerning the Iraq war had made the world economic outlook hard to predict (*Monetary Policy Review*, April 2003, p.22), but would have been expected to depress activity. There had been publicity around recently announced increases in administered prices, and there had been large public sector wage increases

[43] Source: SARB Quarterly Bulletin, March and June 2003.

in 2002Q3. Moreover, there was uncertainty concerning unit labour costs data[44]: it later emerged that changes in the employment survey in September, 2002 had made these figures suspect.

In the event, faced with these uncertainties, the MPC in March left rates unchanged at 13.5 percent, which seems a clear error. The first cut of 150 basis points occurred only on the 12th of June, 2003 (Table 4), after the CPIX overstatement of 1.9 percent announced on May 30th. As the extent of the slowdown in growth and inflation became apparent, and given further currency appreciation, further cuts then followed rapidly: 100 basis points in each of August and September; 150 basis points in October and 50 basis points in December. In 2004, the repo rate was held at 8 percent, until an unexpected 50 basis points cut occurred in August, despite gently rising short-term rates in the US and some other industrial countries. The following three MPC meetings in 2004 maintained this rate, and it averaged about 7 percent in the following year.

Criticism of the SARB's initially slow reaction in the first half of 2003 is overshadowed by the resource cost to SA of *Statistics South Africa's* data errors. We saw above that the average overstatement of inflation for the 4 quarters from 2002Q2 to 2003Q1 was 1.2 percentage points for CPIX and a little more for CPI. We believe the result, given forward-looking inflation targeting, was that interest rates were likely kept at least 1 percentage point higher for at least 4 quarters than if the errors had not occurred[45]. Our work on forecasting real GDP for SA (Aron and Muellbauer, 2002a) suggests that a one percentage point rise in real interest rates lowers GDP by around 0.25 percent 4 to 8 quarters later. The cost in output to the economy of these errors made by *Statistics South Africa* could therefore plausibly have been as high as 3 billion Rand.

5.3 Has policy reduced interest rate and output volatility?

The volatility and performance indicators summarised in Table 1 are hard to interpret without taking into account the varying size and nature of shocks in the different periods. Under the present governor, Tito Mboweni, from 1999Q3, the volatility of headline CPI, initially rose

[44] Unit labour costs were estimated at an 11.1 percent annual change for non-agricultural sector for 2002Q3 (later revised down to 8.9 percent). For the manufacturing sector, the annual increase in unit labour costs to 2002Q3 was estimated at only 1.1 percent, later revised down to an incredible minus 2.3 percent (see SARB *Quarterly Bulletin*).

[45] There are two main steps in the argument. The first assumes that the inflation error resulted in an overestimate of the forecast inflation rate, partly because of inflation persistence via wage and price formation, and partly because of commonly used intercept adjustment used by forecasters when previous forecasts are seriously off track, as was clearly believed to be the case in early 2003. The second step assumes that the SARB, like other central banks analysed by Clarida et al (1998), 'leant against the wind' by raising the repo rate by more than forecast inflation. Thus, even if the 1.2 percentage point inflation error averaged over a year resulted in a smaller upward bias of say 0.8 percentage points in the forecast inflation rate, this could easily translate into a repo rate higher by 1 percentage point or more.

substantially, given an increased weight on the mortgage component of the CPI and an increase in the volatility of nominal interest rates. However, the volatility of inflation measured by the consumer expenditure deflator fell. The volatility of output growth remained the same, while the growth rate improved. Given the shocks of this period, this can be regarded as a significant achievement: the tail-end of the 1998Q3 exchange rate shock and the policy reaction to it, and the exchange rate shock of 2001Q4, shocks to U.S. producer prices as well as to US output, equity prices and interest rates, made this a volatile period for monetary policy. The volatility of real interest rates rose slightly from that in the second Stals period[46], and the average level of real rates (not adjusted for tax) declined from 11.5 percent under Stals to 7.7 percent.

Du Plessis and Smit (2003) use the BER model together with estimated extended Taylor Rules for the period 1986-1993 and 1994-2002 to compare more rigorously the stabilizing properties of monetary policy before and after 1994. The former rule includes a money target (excess M3 growth) and the output gap. The latter includes inflation and the output gap, where the latter has a larger estimated weight than before 1994. Simulation results suggest that the post 1994 rule is substantially more effective at generating low inflation and output volatility. Thus, monetary policy improves since 1994 over the preceding period, with an important caveat. The large rise in interest rates in 1998 is treated as a special event (dummy), not allowed to contaminate the post 1994 policy rule.

6. Are real interest rates too high under inflation targeting?

Critics of the monetary policy framework in SA argue that it has resulted in real interest rates being kept too high, with a consequent cost in growth and high unemployment. Our objection to this view has been discussed elsewhere (Aron and Muellbauer, 2005). We summarise the main points here.

Power, in 2004[47] has argued that *equity finance* in SA is inordinately expensive and constrains growth. Given assumptions about the size of the equity premium relative to government bonds, he puts this down to high bond yields, blaming the aggressive application of inflation targeting. There are serious problems with his argument and his proposed alternative monetary framework of exchange rate targeting.

[46] On a measure using the forward-looking inflation rate, volatility declined.
[47] The equity cost of capital is discussed, for example, in a *Business Day* (SA) article on 4 August, 2004.

First, bank finance is an important alternative to equity finance[48] and tax-adjusted real borrowing rates have been moderate. The relevant tax rate for companies is the *real* and *after-tax* rate, as interest payments by companies are tax-deductible (Jansen, 2004). In Table 7, we compare SA's tax-adjusted real interest rates[49] for the last five years with those of the US, UK, Australia, Chile and Brazil. Contrary to the view of critics, SA's *real* domestic tax-adjusted cost of borrowing to companies does not seem strongly out of line with competitors. For instance, SA's tax-adjusted real rates largely lie below Chile's and are below Australia's in every year except for 2001; they are substantially below Brazil's rates (except in 2003, though bank margins are so high in Brazil that bank lending rates always exceed SA's); and they lie below those of the UK, except in 2003 and 2004. In 2003-2005, SA's real rates exceed those of the US, where real policy rates were negative in the aftermath of the 2001 recession and the events of 9/11.

Another perspective on comparative real interest rates is given by an open economy view of the drivers of real rate differentials of government bonds. These are relevant for Power's argument about equity finance, and because they influence the cost of corporate bond finance. These bond differentials have fallen since the late 1990s in SA, but not as far as expected. The question is why and whether monetary policy is to blame. The real bond rate differential between SA, and, say, the US, is given by the expected real depreciation of the Rand against the Dollar, plus a risk premium. The risk premium reflects real exchange rate uncertainty (a combination of nominal exchange rate and relative inflation uncertainty), global risk appetite (i.e. the willingness of global investors to invest in emerging market assets), political uncertainty and administrative restrictions, for example, on capital flows (Kahn and Farrell, 2004). Quantitative and qualitative information can help elucidate the factors behind high real bond rates in SA.

One element in the risk premium, abstracting from real exchange rate uncertainty, is sovereign risk, the market's perception of the probability of default by the South African government on its foreign denominated bonds. It is measured by the spread between South African foreign denominated government bonds (e.g. the 2017 US Dollar denominated bond, first issued in 1997) and those of foreign governments (e.g. the US government) over comparable duration. Sovereign risk spreads narrowed for most emerging markets, and approached their previous lows achieved in 1997-98, by 2005.

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[48] In each year of the last decade new equity finance accounted for less than 4 percent of the funding of industrial companies on the Johannesburg Stock Exchange (Jansen, 2004). Debt, including trade credit, made up 40-50 percent of funding, with retained earnings accounting for around 40 percent. The situation is similar in the UK and other major economies.

[49] We employ short-term market interest rates, and, for comparability, backward-looking annual inflation rates, adjusting nominal rates for tax using the KPMG annual survey on corporate tax rates.

Quantitative work by Ahmed et al (2005) on the determinants of SA's sovereign spread (Figure 9) finds that for 1997-2003, the improved global risk appetite (proxied by the emerging market bond index spread in the figure) partly explains the reduced spread. Part of it is due to the shorter horizon of the bonds: as the date of maturity moves closer, risk diminishes over the shorter horizon. The spread is lower the higher are gross foreign exchange reserves, the lower is the size of the forward book, the lower is recent exchange rate depreciation and the higher is the growth rate of GDP. This work suggests the spread in Figure 9 should have fallen by even more. All the main factors driving the spread have moved in the right direction: the forward book has been retired; global risk appetite has fallen to historic lows; the state of the public finances has improved significantly; the recent relative growth record has improved; the exchange rate has appreciated and the time to maturity of the 2017 bond is now 12 years instead of the 20 years it had been in 1997.

While the measured factors show rigorous links to sovereign risk, there are slowly evolving, hard-to-measure factors that also matter. These could be accounting for the failure of the spread to narrow further, sustaining high real bond rates in SA. Some aspects of political uncertainty may have increased over this period. Many reports by international investment banks, and many of those giving evidence to the Myburgh Commission (2002) on the depreciation of the Rand, suggest that international investors were likely to have been influenced by SA's attitude to the violation of property and other civil rights in Zimbabwe, the economic disaster that has befallen SA's neighbour, and also the possible long-term implications for the South African government deficit of the HIV-AIDS crisis.

Inflation targeting cannot conceivably have increased either sovereign risk or real exchange rate risk[50]. If anything, the increased clarity and transparency of monetary policy, combined with sound fiscal policies, should have reduced both kinds of risk. Inflation targeting creates incentives for other economic policies to encourage efficiency and competition, which help to hold down inflation, improve growth and permit lower interest rates. Modern investment theory puts much emphasis on uncertainty discouraging or at least postponing investment. In SA the forward-looking, tax-adjusted real prime rate for business has been under 1 percent since

[50] Grandes et al (2003, 2005) calculate the currency premium - that part of the one year interest rate differential with the US not due to sovereign risk, for Rand-denominated bonds of one year maturity, as 728 basis points over 2000-2002. Their empirical study on the determinants of the currency premium suggests retirement of the NOFP has reduced the currency premium; building up foreign exchange reserves reduces the risk of speculative attacks; inflation targeting with the target being met reduces the premium; but that the effect of capital control regulations is hard to evaluate. However, they do not explicitly mention the most obvious reason for the 728 basis points premium – the inflation differential between SA and the US. Their empirical work is flawed by this and other problems, including finding that the most significant variables explaining the one year premium have the opposite sign of that predicted by their theory.

2000. Continued reductions in uncertainty permitted by the inflation targeting framework, are likely to do more for investment than unsustainable reductions in real interest rates, likely to increase instability.

Structural aspects over which monetary policy has no direct influence also help to explain the cost of capital. The World Bank's *World Development Report 2004* emphasises international differences in the cost of doing business as an explanation for investment, productivity and growth difference between nations. The 'Doing Business' score sheet for SA compares well with the average for OECD economies in many respects, especially in access to credit. In two dimensions it falls behind: rigidity of employment (high costs of hiring and firing); and the recovery rate after bankruptcy proceedings, reported as 32 percent, compared with an OECD average of 72 percent. Crime rates were not part of the score sheet, but are clearly far higher than for the OECD average. These three aspects increase the risk of doing business, and so contribute to raising the expected return required before private investors will invest.

Further, there are costs related to redistribution. SA has a tragic legacy from the Apartheid years of exclusion of black South Africans from economic life – from quality education, many types of jobs, entrepreneurship and land-ownership. It is inevitable that as the gradual process of redistribution takes place, the returns to capital, whether existing or new, will effectively be 'taxed' in some form to fund this redistribution. In anticipation of such future 'taxes' – whether these involve the transfer of mining rights, compulsory purchase of land, pressure to source from black-owned companies or literal taxes, it seems likely that investors will require an additional risk premium to invest in SA. The more gradual, transparent and predictable is this "taxation" process, the lower is likely to be the risk premium.

7. Conclusion and complementary policies

This paper has contrasted the monetary policy regimes under Stals and Mboweni since 1994. Under inflation targeting, transparency and accountability have improved immensely, and further improvements are in prospect. There is evidence of a gain in credibility and anchoring of inflationary expectations under targeting. The suggested improvements for greater central bank transparency should improve the predictability of interest rates. Building models that reflect more accurately the operation of the monetary transmission mechanism, particularly through asset prices, is an ongoing process (see Aron et al, 2006). It would be useful to open these models to public scrutiny and to the international research community.

There have been important gains in the performance of monetary policy. The last five years have seen considerable volatility and sizeable external shocks. It is a creditable achievement that inflation and output volatility have declined, with a strong improvement in the growth rate since 2002. Mistakes have been made, but on a far smaller scale than before 2000. We have contrasted the steady handling of the 2001 exchange rate shock under inflation targeting and its clear policy priorities with the costly policy mistakes during the 1998 exchange rate shock, when the monetary policy rule was not transparent, dual policy objectives were operative and hence heavy forward intervention occurred in the foreign exchange market. The closure in 2003 of the large NOFP position created by the previous monetary policy regime is an important achievement, and frees the SARB to accumulate foreign exchange reserves for reducing short-term exchange rate instability, and thus inflation and interest rate volatility.

One of the advantages of the inflation targeting framework, which could be more appreciated by commentators, is that it creates positive incentives for politicians. Inflation is reduced by supply side improvements, for example, in productivity and competition. A privatization may involve a trade-off between somewhat higher short-term gains to the Treasury by allowing monopoly rents to be earned, and a more competitive structure which will lower inflation. Knowing that the SARB would be compelled to reduce interest rates because of lower inflation increases the attraction of the competitive alternative. While the motivation is understandable, nevertheless policies that restrict tendering for contracts to achieve ambitious short-term targets for black empowerment or affirmative action employment are liable to raise inflation rates through reduced productivity and reduced competition. Having a national focus on the SARB's inflation target and knowing what the interest rate response will eventually be should help to restrain policies with inflationary implications.

As Svensson has emphasised in his reviews of monetary policy in Norway and New Zealand (Svensson, 2001; Svensson et al, 2002), however well monetary policy is run, it is only one policy arena relevant for determining macro-economic outcomes. Fiscal policy, the legal and regulatory framework, and the *quality* of data available to the Central Bank and to the Treasury all have important implications for outcomes (see Section 5). Regular refreshment of firm-based censuses and surveys of employment is standard international practice. Failure by *Statistics South Africa* until recently to follow such practices[51] has meant that estimates of unit labour costs,

[51] Prior to March 2003, the Survey of Employment and Earnings had serious limitations, excluding information from the following industries: agriculture, hunting, forestry and fishing; restaurants and other eating and drinking places, boarding houses, caravan parks and guest farms; storage, water and air transport; telecommunication services; financial institutions other than banking institutions and insurance companies; real estate and business services; educational services; medical, dental and other health

productivity growth and employment growth for South Africa have long been highly unreliable, creating much greater uncertainty about basic economic trends, than faced by other major central banks. Another important instance has been the costly problem with CPI data construction (discussed in section 5, and in greater detail in Aron and Muellbauer (2004)). Poor data quality is particularly unfortunate in view of the reliance on modeling under the targeting framework. Modern time series models require two or more decades of reliable data to achieve robust results. Historical data errors unfortunately continue to affect modeling attempts in the future, resulting in a long-lasting deterioration in the quality of future models, forecasts and policy deliberations.

We now consider some policies complementary to monetary policy. We have already argued, in our discussion of the supposedly high cost of capital in SA, that government policies which affect sovereign risk have an influence on the cost of capital. We also argued there that the rectification of the injustice and inequality inherited from the past involve policies raising the risks for private investment in SA. The more transparent, predictable and, in some cases, gradual, are these policies, the better will be the redistribution/growth trade-off.

Economic activity in SA is very responsive to short-term interest rates. One reason is the efficiency of its financial and legal systems, which make its credit markets among the most liberal in the world. The other reason is the floating rate nature of much private debt, which exposes households and businesses to interest rate fluctuations. The floating rate nature of debt is partly the result of volatile inflation and interest rates. As volatility subsides with credible monetary policy, the private sector may be more willing to offer longer-term debt contracts. There may be a role for government to aid in this process via financial regulation, greater transparency and improving information for borrowers.

A paradox of the success of inflation targeting is that it may have exacerbated rising household debt, and hence contributed to higher house prices and lower saving. Faith in the lower volatility of inflation, interest rates and output is likely to raise desired debt to income ratios further (though there is scope for an increase with these ratios less than half those in the UK in 2004). The easy acquisition of debt has fuelled consumption at the expense of personal saving, thus constraining the domestic funds potentially available for corporate investment. Falling nominal interest rates, more affordable mortgages and ease of remortgaging have generated rises in mortgage debt and in house prices[52]. The more valuable housing collateral has itself promoted

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services; welfare organizations; religious organizations; and recreational and cultural services. The Quarterly Employment Statistics, published from June, 2005, covers companies registered for income tax.

[52] The recent peak in annual growth in house prices of 35.5 percent occurred in September, 2004 (*Quarterly Bulletin,* March, 2006).

borrowing and spending. The inflationary consequences are well understood[53] via the output gap, a worsening trade balance and hence a depreciating exchange rate (unless there are other factors strengthening the exchange rate). The potential trade-off for interest rate policy poses serious dilemmas for the MPC.

In Aron and Muellbauer (2005) we discuss in detail several considerations pointing to the desirability of complementary fiscal measures on households to help stabilise the property market and the macro-economy. Well-designed property and land taxes are ideally placed to meet growth and distribution objectives as well as stabilizing the economy (Muellbauer, 2005). Large real house price rises have disturbing implications for the distribution of resources between young households and those households already owning homes, and between poorer and more affluent households. Given SA's extremes of wealth inequality, a progressive and transparent property tax would keep housing more affordable for the young and the poor, and tap the wealth of the most affluent, without much effect on their incentives to engage in economic activity.

Finally, an important reason for volatile interest rates and why controlling inflation in SA is costly in lost output lies in the construction of the headline CPI, with its large interest cost component. Interest rate rises probably have to be *larger* to have enough of a negative impact on expenditure to offset their headline inflation-increasing effect. Countries where CPI used to include mortgage costs, including the US, Australia and New Zealand, have shifted to a definition of homeowners' costs based on imputed rents. Imputed rents are based on rental market observations and respond only gradually to interest rate variations. A rise in interest rates designed to reduce inflation will then not have the perverse short-term effect experienced of immediately *raising* the headline CPI. Imputed rents are also a better approximation to home owners' costs.[54] Furthermore, in the long-run, imputed rents do respond to house prices, which, quite illogically, play no role in the current approximation to home owners' costs. A switch to the imputed rent basis would make it possible to base monetary policy on a single new headline CPI. This would avoid the confusion to wage negotiators of choosing between CPI and CPIX, and the risk that trade unions will demand compensation for whichever of the two has risen more.

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[53] The Bank of England's MPC has been struggling with related dilemmas for much of the last decade.

[54] A current cash flow measure of mortgage costs is a poor measure of households' costs when households have sufficient housing equity to refinance, so reducing the cash-flow impact of a rise in interest rates (but leaving real mortgage costs unchanged).

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Table 1: Overview of macro-aggregates by regime of central bank governor

Party	**National Party government**		**ANC government**	
Governor Regime	**De Kock** *1981q1-1989q2*	**Stals** *1989q3-1994q1*	**Stals** *1994q2-1999q2*	**Mboweni** *1999q3-2004q4*
Macro-variable	*Average*	*Average*	*Average*	*Average*
Nom. exchange rate change (%)	-11.0	-5.7	-9.0	-1.5
NEER (level) *volatility*	0.16	0.06	0.11	0.14
Real exchange rate change (%)	-1.4	2.5	-3.6	2.7
REER (level) *volatility*	0.12	0.03	0.07	0.10
Inflation rate (CPI, %)	14.7	13.3	8.0	5.3
Inflation rate (CPI) *volatility*	2.5	2.2	2.4	4.6
Inflation rate (CPD, %)	14.9	14.6	8.1	6.7
Inflation rate (CPD) *volatility*	2.7	2.4	2.5	2.2
Inflation rate (CPIX, %)	-	-	-	6.9
Inflation rate (CPIX) *volatility*	-	-	-	2.1
Nominal interest rate (%)	17.1	19.0	19.2	14.2
Nominal interest rate *volatility*	4.4	1.7	1.7	3.0
Real interest rate (%)	3.3	5.4	11.5	7.7
Real interest rate *volatility*	5.4	1.4	2.7	2.9
Growth rate (%)	1.8	-0.2	2.6	3.6
Growth rate *volatility*	3.7	2.4	1.7	1.7
Growth rate per capita (%)	-0.6	-2.6	0.5	2.5

Sources: Monthly and quarterly data from the *Quarterly Bulletin (SARB)* and *International Monetary Fund (IFS).*

Notes:

1. Governor De Kock began his tenure on 1 January, 1981; Governor Stals on 8 August, 1989; and Governor Mboweni on 7 August, 1999.
2. Changes are annual percentage changes.
3. The volatility measures are defined as follows: e.g. for inflation, *the absolute value* of the annual percentage change in inflation less annual percentage change in inflation one year ago. This measure places less emphasis on outliers than the conventional standard deviation.
4. Unlike the CPI, the consumer price deflator (CPD) contains no interest rate component; nor does the CPIX ("metropolitan and urban"), but it is available from 1994 only, and policy-relevant from 2000.
5. Nominal and real effective exchange rates are the latest measure excluding Zimbabwe, spliced in 1990 to the preceding measure, which includes Zimbabwe.

Table 2: Monetary Policy Regimes

Years	**Monetary Policy Regime**
1960-1981	Liquid asset ratio-based system with quantitative controls on interest rates and credit
1981-1985	Mixed system during transition
1986-1998	Cost of cash reserves-based system with pre-announced monetary targets (M3)
1998-	Daily, later weekly, tenders of liquidity through repurchase (repo) transactions, plus inflation targets (CPIX) from February, 2000

Table 3: Measuring Central Bank Transparency

	Weights			Australia	New Zealand	UK	South Africa *Stals*	South Africa *Mboweni*
	E/G	P	M/S					
Year assessed				*2002*	*2002*	*2002*	*1994*	*2004*
1. Political				**3**	**3**	**3**	**1**	**3**
a. Objectives	1	1	1	1	1	1	0.5	1
b. Targets	1	1	1	1	1	1	0	1
c. Arrangements	1	1	2	1	1	1	0.5	1
2. Economic				**2**	**3**	**3**	**0.5**	**1**
a. Economic Data	1	1	1	0.5	1	1	0.5	0.5
b. Policy Models	1	1	0.5	1	1	1	0	0
c. Forecasts	1	1	2	0.5	1	1	0	0.5
3. Procedural				**1**	**3**	**3**	**0**	**1**
a. Strategy	1	1	1	1	1	1	0	1
b. Minutes	1	0	1	0	1	1	0	0
c. Voting Records	1	0	.5	0	1	1	0	0
4. Policy				**1.5**	**3**	**1.5**	**1.5**	**2**
a. Announcement	1	1	1	1	1	1	1	1
b. Explanation	1	1	1.5	0.5	1	0.5	0.5	1
c. Inclination	1	0	0	0	1	0	0	0
5. Operational				**1.5**	**2**	**2.5**	**2**	**2**
a. Control Errors	1	1	0.5	1	1	1	1	1
b. Disturbances	1	1	1	0.5	0.5	1	0.5	0.5
c. Evaluation	1	1	2	0	0.5	0.5	0.5	0.5
Weighting	***Total possible score***			***Total country score for different weights***				
Eiffinger/Geraats [2]	15			9	14	13	5	9
Plenderleith [3]		12		9	11	11	5	9
Mahadeva/Sterne [4]			16	9.75	14.5	14.25	6.25	11
Normalised scores								
Eiffinger/Geraats [2]				0.60	0.93	0.87	0.33	0.60
Plenderleith [3]				0.75	0.92	0.92	0.42	0.75
Mahadeva/Sterne [4]				0.61	0.91	0.89	0.39	0.69

Sources: Australia, New Zealand and United Kingdom*:* Eijffinger and Geraats (2006); South Africa: authors' calculations in this paper – see Appendix 1.

Notes:

1. For comparative purposes, the index applies the same survey questions and weighting used by Eijffinger and Geraats (2006).
2. Eijffinger and Geraats (2006) apply equal weights of 1 (denoted E/G).
3. Alternative weights (denoted P) suggested by Mr. Plenderleith, Deputy Governor of the SARB, 2003-2006, assign a zero weight to minutes (3b), voting records (3c) and inclination (4c).
4. Weights denoted S/M are derived by the authors from chapter 4, Mahadeva and Sterne (2000). We are grateful to Gabriel Sterne of the Bank of England for suggesting we try this.

Table 4: MPC meetings and interest rate decisions

MPC meeting	Meetings used in Table 5 regressions	Repo rate (effective next day)	Comment	Prime rate (end of month)
1999				
13-Oct		~12.31		15.5
24-Nov		**~12**	Fixed repo rate	15.5
2000				
13-Jan		**11.75**	Discontinue fix	**14.5**
2-Mar	1	~11.75	Postponed from 22-Feb	14.5
6-Apr	2	~11.75		14.5
19-May	3	~11.75		14.5
15-Jun	4	~11.75		14.5
11-Aug	5	~11.75		14.5
21-Sep	6	~11.75		14.5
16-Oct	**7**	**12**	Special meeting	14.5
16-Nov	8	12		14.5
2001				
19-Jan	9	12		14.5
16-Mar	10	12		14.5
25-Apr	11	12		14.5
14-Jun	12	**11**		**13.75**
26-Jul	13	11		**13.5**
4-Sep	NA	**10**	No MPC statement: technical change.	**13**
20-Sep	14	**9.5**		13
15-Nov	15	9.5		13
2002				
15-Jan	16	**10.5**	Special meeting	**14**
14-Mar	17	**11.5**		**15**
13-Jun	18	**12.5**		**16**
12-Sep	19	**13.5**		**17**
20-Nov	20	13.5		17
2003				
20-Mar	21	13.5		17
12-Jun	22	**12**		**15.5**
14-Aug	23	**11**		**14.5**
10-Sep	24	**10**	Special meeting	**13.5**
16-Oct	25	**8.5**		**12**
11-Dec	26	**8**		**11.5**
2004				
26-Feb	27	8		11.5
22-Apr	28	8		11.5
10-Jun	29	8		11.5
12-Aug	30	**7.5**		**11**
1-Oct	31	7.5		11
9-Dec	32	7.5		11
2005				
10-Feb	33	7.5		11
14-April	34	**7.0**		**10.5**
9-June	35	7.0		10.5
11-Aug	36	7.0		10.5

MPC meeting	Meetings used in Table 5 regressions	Repo rate (effective next day)	Comment	Prime rate (end of month)
13-Oct	37	7.0		10.5
8-Dec	38	7.0		10.5
2006				
2-Feb	39	7.0		10.5
13-April	40	7.0		10.5
8-June	41	**7.5**		**11**

Sources: MPC statements, SARB website; *Quarterly Bulletin;* IFS (IMF).
Notes:
1. Dates at which interest rates were *changed* are highlighted in bold (only these are reported in the *Quarterly Bulletin*).
2. The "~" refers to the characterisation of the rate as "at or around" in the MPC statement.
3. Rate change on 4-Sep 2001 reported in *Quarterly Bulletin.*

Table 5: Relationship between the Reserve Bank repo rate and market trader interest rates

FRA	*Coefficient*	*To end-2004*	*Sigma eq./ (R^2)*	*To June, 2006*	*Sigma eq./ (R^2)*
1x4-month	β_i (*before*)	0.59 (7.5)	0.289/ (0.65)	0.56 (8.0)	0.266/ (0.62)
	β_i (*on*)	0.09 (2.7)	0.117/ (0.20)	0.09 (3.3)	0.105/ (0.22)
2x5-month	β_i (*before*)	0.62 (7.02)	0.328/ (0.62)	0.60 (7.5)	0.305/ (0.59)
	β_i (*on*)	0.14 (2.7)	0.189/ (0.19)	0.15 (3.2)	0.173/ (0.21)
3x6-month	β_i (*before*)	0.66 (6.1)	0.404/ (0.55)	0.65 (6.5)	0.377/ (0.52)
	β_i (*on*)	0.19 (2.6)	0.270/ (0.18)	0.21 (3.2)	0.247/ (0.20)
6x9-month	β_i (*before*)	0.68 (4.5)	0.562/ (0.4)	0.67 (4.9)	0.515/ (0.38)
	β_i (*on*)	0.16 (2.3)	0.258/ (0.15)	0.16 (3.0)	0.241/ (0.17)
9x12-month	β_i (*before*)	0.60 (3.4)	0.662/ (0.27)	0.59 (3.7)	0.604/ (0.26)
	β_i (*on*)	0.15 (2.4)	0.223/ (0.16)	0.15 (2.4)	0.210/ (0.18)
12x15-month	β_i (*before*)	0.52 (2.8)	0.690/ (0.21)	0.52 (3.1)	0.631/ (0.20)
	β_i (*on*)	0.12 (2.0)	0.225/ (0.12)	0.14 (2.5)	0.210/ (0.14)

Sources: Authors' regression estimates, data from Table 4 and JPMorgan, Johannesburg.
Notes:

1. The regression is $\Delta \boldsymbol{R}_{i,t} = \alpha_i + \beta_i \Delta r_t + e_{i,t}$ i= 1,2 , where α_i is the estimated constant, Δr_t represents the change in SARB's repo rate, β_i(*before*) is the estimated coefficient in the regression where $\Delta R_{1,t}$ is the change in market interest rate from the day following the previous MPC meeting at time t-1 to the day preceding the current meeting at time t, denoted "*before*"; and β_i (*on*) is the estimated coefficient in the regression where $\Delta R_{2,t}$ is the change in the closing market interest rate on the day preceding the current MPC meeting to the close on the meeting day, at time t, denoted "*on*".
2. t-ratios are in parenthesis under the coefficients; the reported sigmas are the standard errors of the equations, with the R^2 in parenthesis beneath them.
3. The samples cover 32 MPC meetings from the start of inflation targeting to the end of 2004 (excluding the technical adjustment meeting, see Table 4), and 41 meetings to the end of June, 2006, see Table 4.

Table 6: Simple evaluation of SARB forecast errors

Date of MPR	**Date of forecast**	**Forecast: 1 year ahead**	**Actual: 1 year ahead**	***Forecast error***	**Forecast: 2 years ahead**	**Actual: 2 years ahead**	***Forecast error***
May.2006	2006Q2	5	N/A	N/A	4.7	N/A	N/A
Nov.2005	2005Q3	5.7	N/A	N/A	5.3	N/A	N/A
May.2005	2004Q4	4.8	4	-0.8	5.0	N/A	N/A
Nov.2004	2004Q2	4.8	3.7	-1.3	5.6	N/A	N/A
May 2004	2003Q4	5.9	4.4	-1.5	5.7	4	-1.4
Oct. 2003	2003Q2	4.5	4.7	0.2	5.1	3.7	-1.6
Mar.2003	2002Q4	5.7	4.2	-1.6	5.7	4.4	-1.3
Oct. 2002	2002Q2	6.4	7.6	1.2	5.2	4.7	-0.5
Apr.2002	2001Q3	8.1	10.2	2.1	5.3	6.1	0.8
Oct. 2001	2001Q1	5.9	7.0	1.1	6.0	9.6	3.6
Mar.2001	2000Q3	6.5	5.6	-0.9	5.2	10.2	5.0

Sources: One and two year ahead forecasts read off the fancharts, *Monetary Policy Review*, SARB; actual data from the SARB's *Quarterly Bulletin* (four quarter changes, %). SARB forecast errors are the difference between the two.

Notes:

1. Actual inflation is the quarterly average of monthly CPIX data.
2. Where data are not yet available, this is indicated by N/A.

Table 7: Comparative real tax-adjusted market interest rates

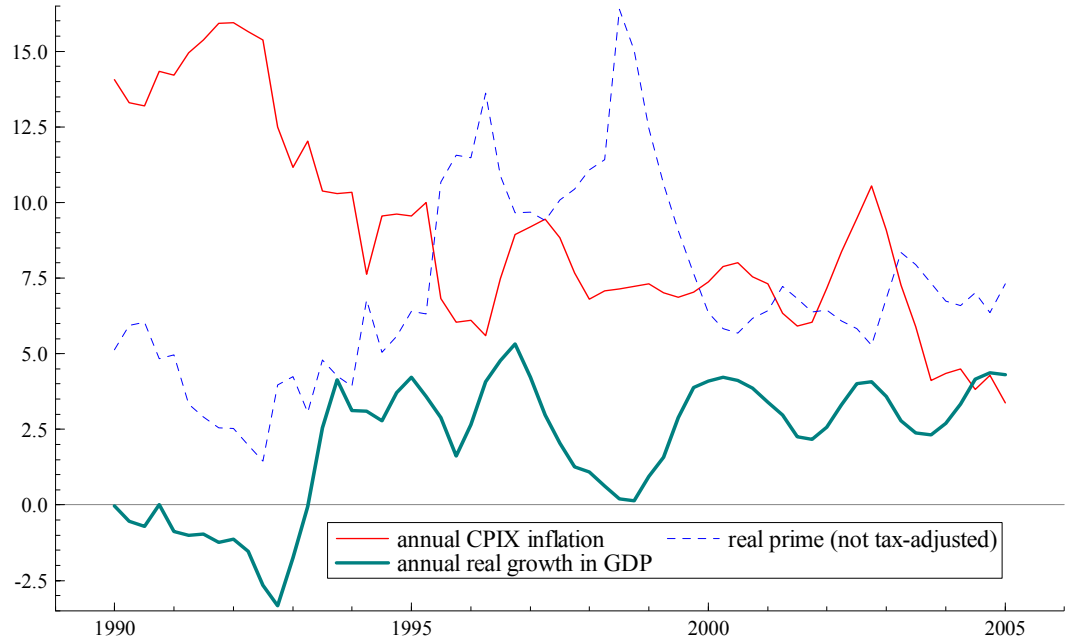
	2000	2001	2002	2003	2004	2005(2q)
Treasury bill rates[1]						
UK	1.10	1.48	1.06	-0.42	0.14	0.18
US	0.13	-0.74	-0.61	-1.63	-1.80	-1.32
Australia	-0.60	-1.17	-	-	-	-
Australia[2] (bank acc bill)	-0.47	-1.11	0.31	0.64	1.46	1.51
Brazil	4.31	5.99	4.07	-0.16	4.43	4.73
Chile PDBC	5.11	2.49	0.79	-0.49	0.47	-0.14
SA	-1.59	-0.55	-2.15	0.17	0.34	0.76
Percentage effective corporate tax rates[3]						
UK	30	30	30	30	30	-
US	40	40	40	40	40	-
Australia	36	34	30	30	30	-
Brazil	37	34	34	34	34	-
Chile	15	15	16	16.5	17	-
SA	37.8	37.8	37.8	37.8	37.8	-

Sources: Treasury bill rates (NOM_j, 60c) and the consumer price index (CPI, 64) are from the International Monetary Fund, International Financial Statistics (IFS). The South African CPI measure used is the targeted CPIX (metropolitan and urban) from the South African Reserve Bank. Tax adjustment uses the KPMG survey of corporate tax rates, 2004, 2003, 2002, 2001 and 2000 – denoted "tax", after scaling by 100.

Notes:

1. The real interest rates are defined as follows: $REALi_t = 100((1+\frac{(1-tax)NOMi_t}{100})\frac{CPI_{t-4}}{CPI_t}-1)$
2. Australia's treasury bill rates are incomplete in the August 2005 IFS data base, ending in 2002. We also show the Bank accepted Bills (90 days), from the Reserve Bank of Australia. For Chile, which has no treasury bill rate as reported in IFS, we use the Interest Rate on Central Bank Discountable Promissory Notes (PDBC or Pagarés Descontables del Banco Central), 90 days, from the Banco Central de Chile.
3. Notes on tax rates for 2004 for the other countries can be obtained from the KPMG survey. For *South Africa:* The corporate tax rate applicable to companies is currently 30%. However South Africa imposes an additional 'Secondary Tax on Companies' at the rate of 12.5% on any net dividends declared. The effect of this additional tax is that if a company distributes 100% of its retained earnings as a dividend, then an effective tax rate of 37.78% will apply. This does not apply to gold mining companies, which are taxed on a formula basis. Source: Income Tax Act 58 of 1962 as amended by Act No. 30 of 2002 issued by the South African Government.

Figure 1: Real growth, CPIX inflation and the real prime interest rate

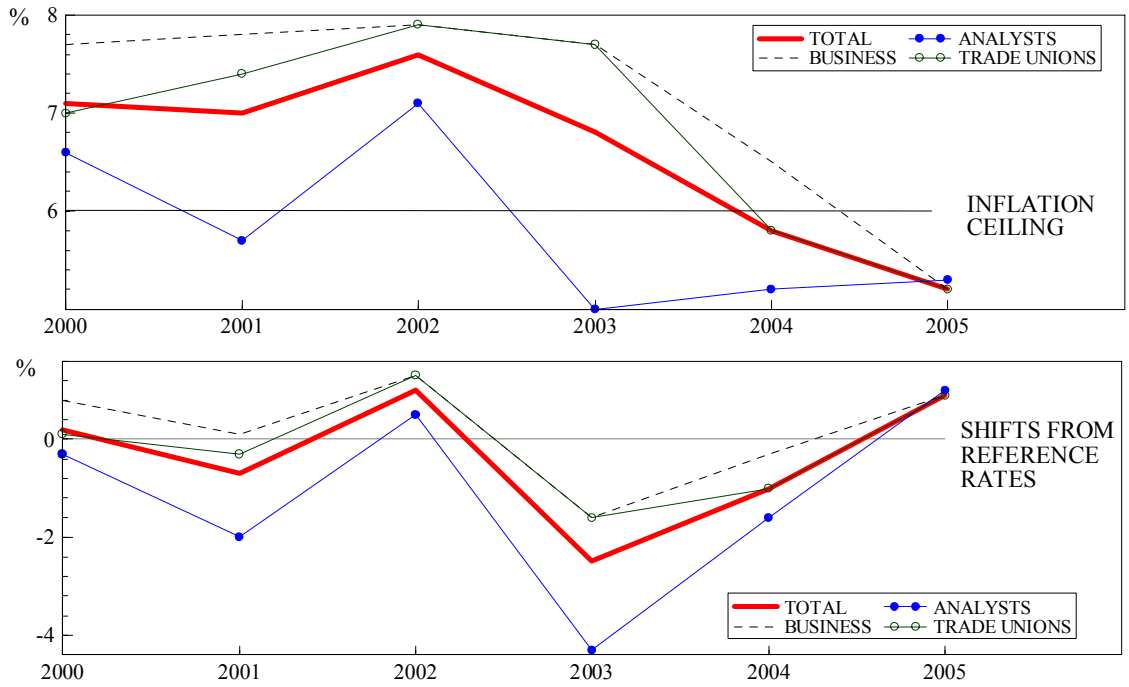


Sources: The prime rate (SA60P) is from IFS (International Monetary Fund). Real GDP, seasonally adjusted, is from the SA Reserve Bank. The CPIX measure is our constructed (seasonally unadjusted) measure for metropolitan and urban areas (Aron and Muellbauer, 2004), spliced in February 2000 (when targeting began) to the seasonally unadjusted CPIX measure, obtained from *Statistics South Africa.*

Notes:

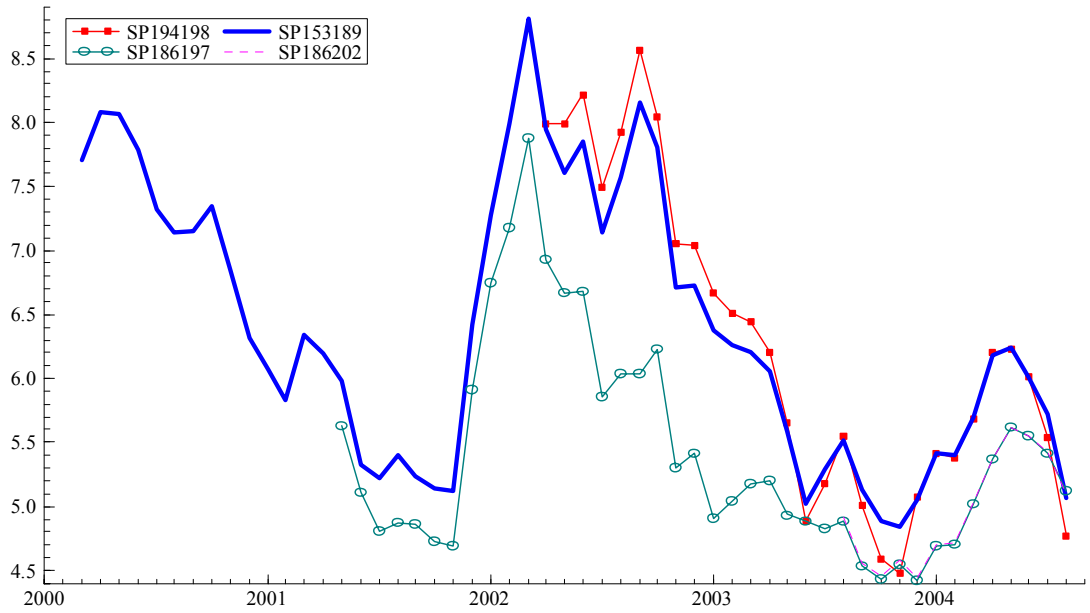
1. The target announced in February, 2000, was specified as an average rate of increase in CPIX of 3-6 percent per annum for the calendar year 2002. This was revised in October, 2001 to 3-6 percent for 2003 and 3-5 percent for 2004 and 2005; in October 2002, to 3-6 percent for 2004 and 3-5 percent 2005; and in February, 2003, the target range for 2005 was increased from 3-5 percent to 3-6 percent. In November, 2003, the target definition also altered from a fixed target of an annual average rate over a calendar year to a continuous target, of 3-6 percent for the period beyond 2006.

Figure 2: *3rd quarter* CPIX inflation expectations (one year ahead) and expected shift in inflation



Source: Inflation Expectations Survey, Bureau of Economic Research, University of Stellenbosch.
Notes:
1. The inflation ceiling fell temporarily to 5 percent in 2001 (see Figure 1).
2. Shifts are calculated relative to the reference rate given on the survey form for average inflation in the preceding year. Third quarter data are used to give a consistent expectations horizon for the largest possible sample (five years). The two year ahead shifts are similar.
3. The reference rates from the survey are: 6.9% (2000 survey, average annual inflation in 1999), 7.7% (2001), 6.6% (2002), 9.3% (2003), 6.8% (2004) and 4.3% (2005) (the reference rate for 2006 is 3.9%).

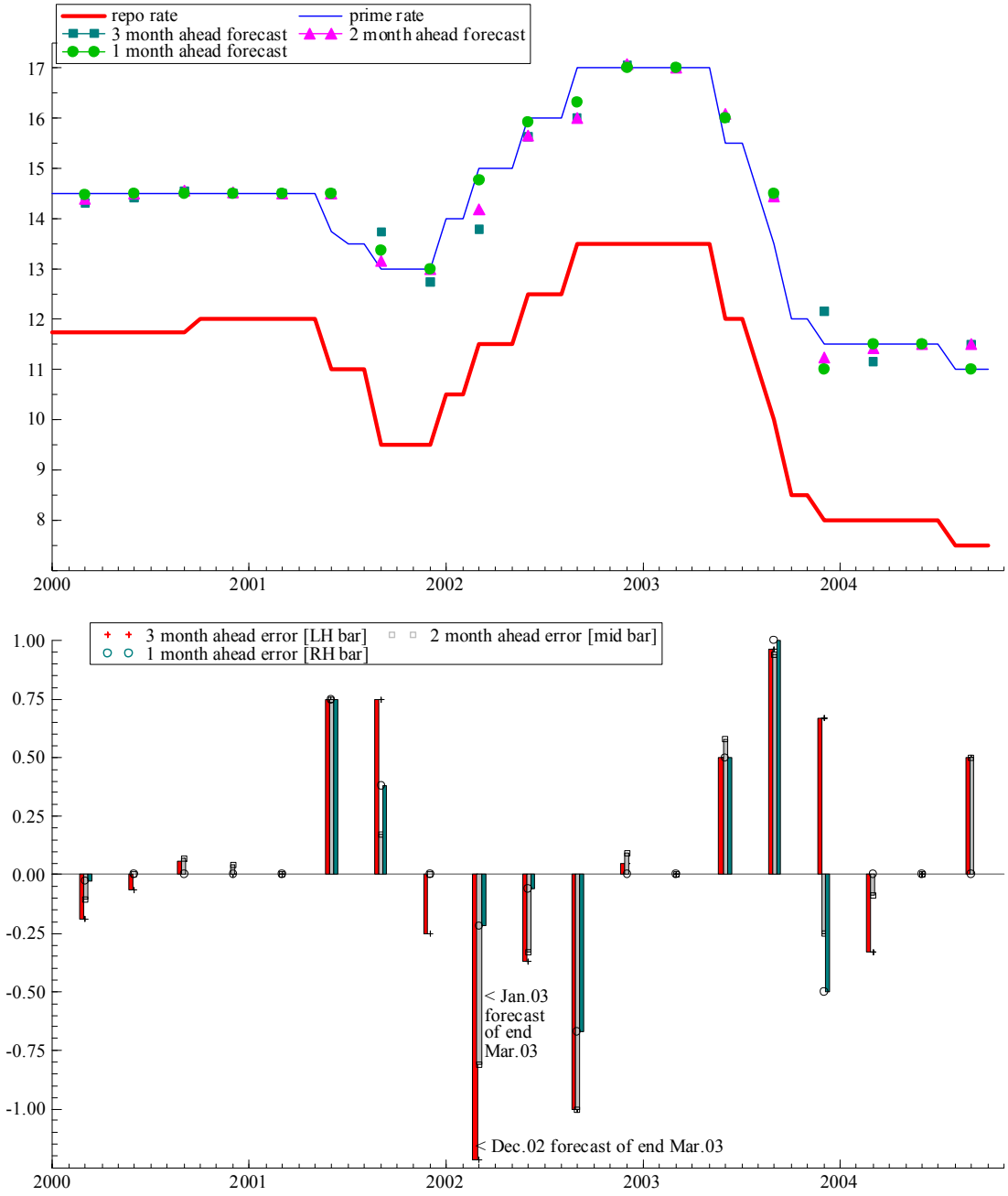
Figure 3: Spreads between index linked bonds and bonds of comparable maturity



Source: Original yields from Bloomberg (Fassler, JPMorgan Chase)
Notes:
1. The index linked bonds are 189 (redemption date, March, 2013), 198 (March 2008), 197 (December, 2023), 202 (December 2033), with yields divided by 100.
2. The corresponding matches are, respectively, 153 (August, 2010), 194 (February, 2008), 186 (December, 2026) for both 197 and 202, with yields divided by 100.
2.Calculations by authors as follows e.g., for the pair R194 and R198:

$$100x(\left(\left(1+\frac{R194}{2}\right)^2 \Big/ \left(1+\frac{R198}{2}\right)^2\right)-1)$$

Figure 4: The predictability of interest rate decisions

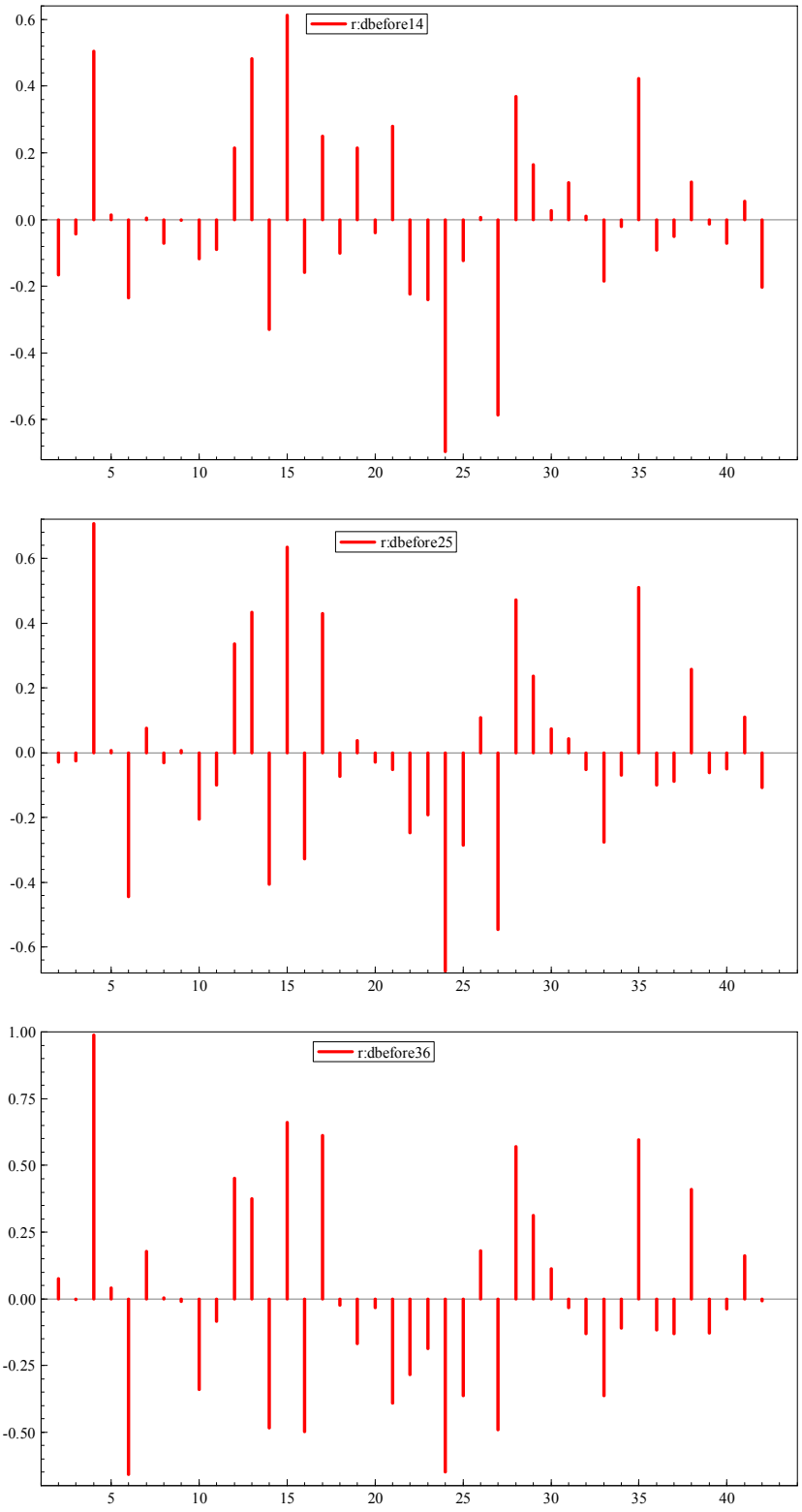


Source: Reuters monthly consensus forecasts.

Notes:

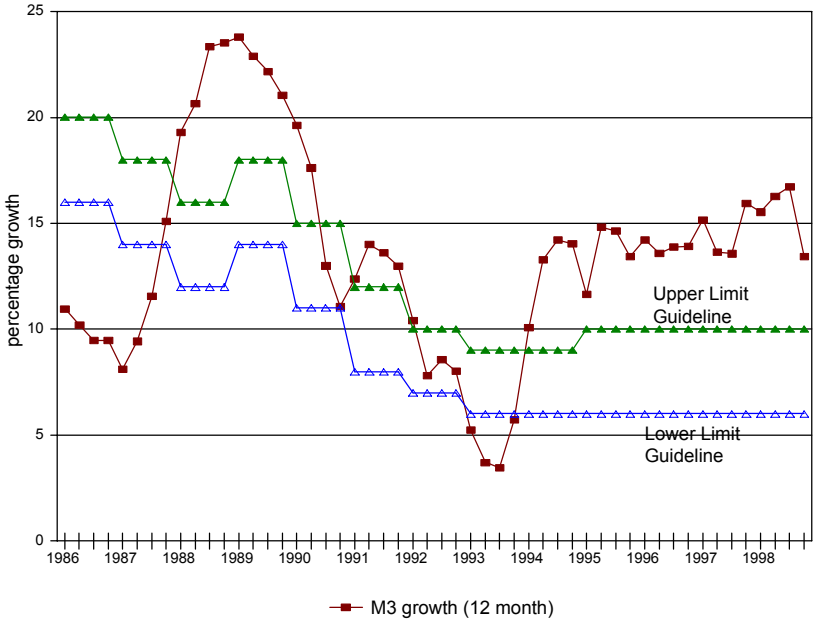
1. We choose the data with the shortest forecast period, which is a quarter ahead.
2. In each quarter, surveys in the first two months predict for the end of the quarter. The survey in the final month of the quarter predicts for the end of the next quarter. Thus, there are three forecasts for the end of each quarter, and each successive forecast uses more recent information than the last.
3. The top graph shows the actual forecasts for the end of each quarter. The graph beneath shows the prediction errors, obtained by subtracting the end of month prime rate in the last month of the relevant quarter from each of the forecasts for that end of quarter.
4. Unscheduled MPC meetings were held on 15 January, 2002 and 10 September, 2003 (Table 4).

Figure 5: Unscaled residuals (percentage error) for the 1x4, 2x5 and 3x6 FRAs, plotted against the MPC meetings used in the "before" regressions



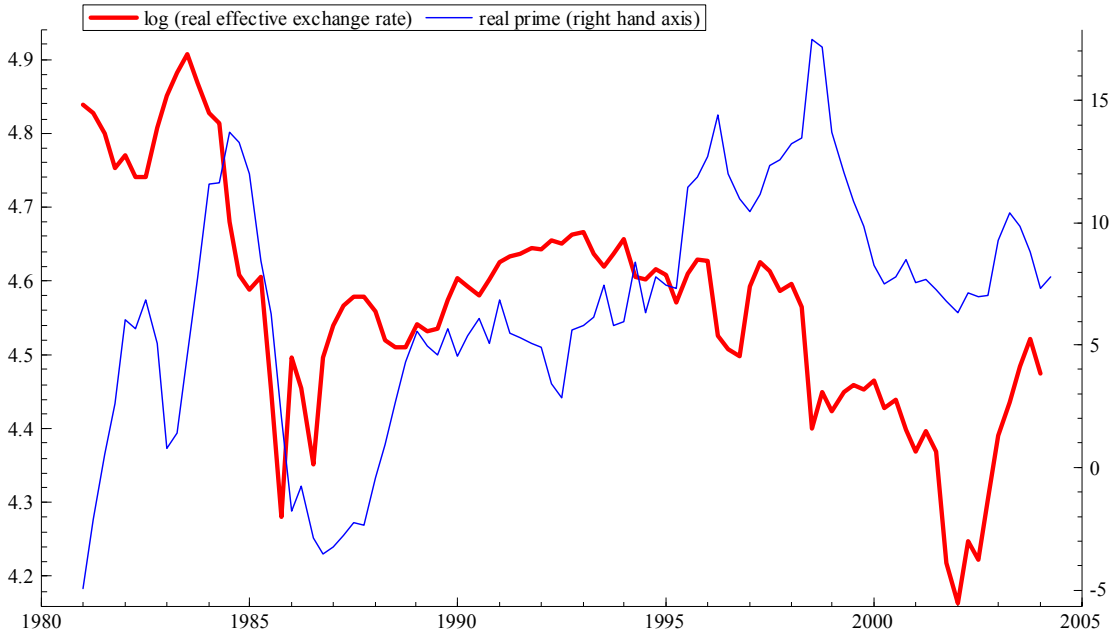
Note: The full sample from March, 2000 to mid-June, 2006 is used in these regressions (see Table 4 and 5).

Figure 6: Money Growth: Actual and Target Guidelines in the pre-1999 era



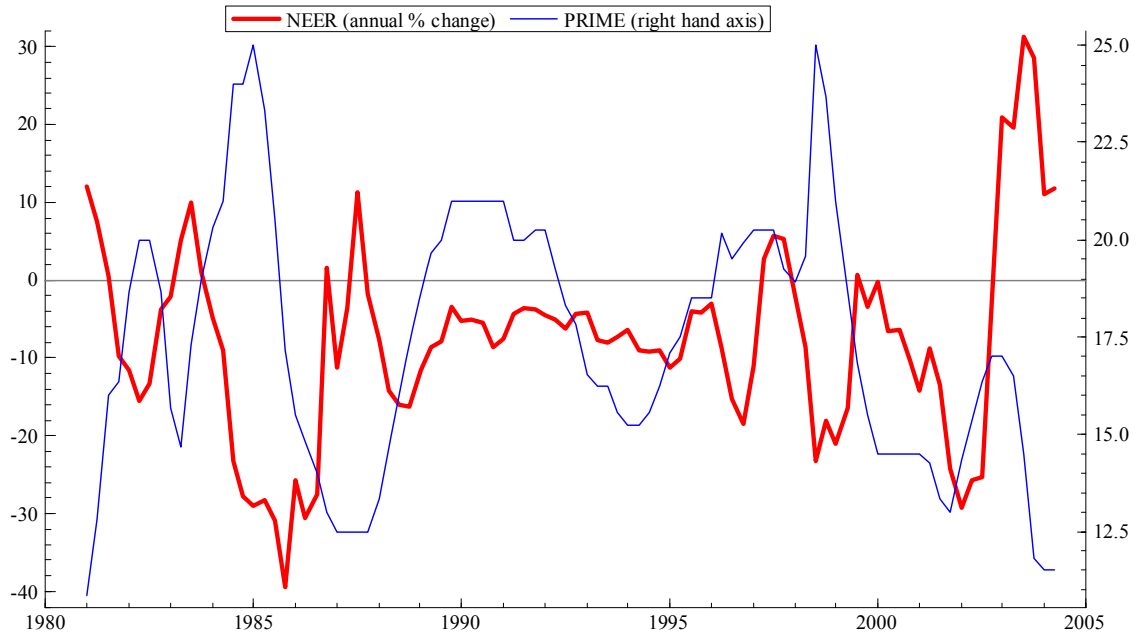
Source: Aron and Muellbauer (2002b).

Figure 7: The real effective exchange rate and the real prime rate



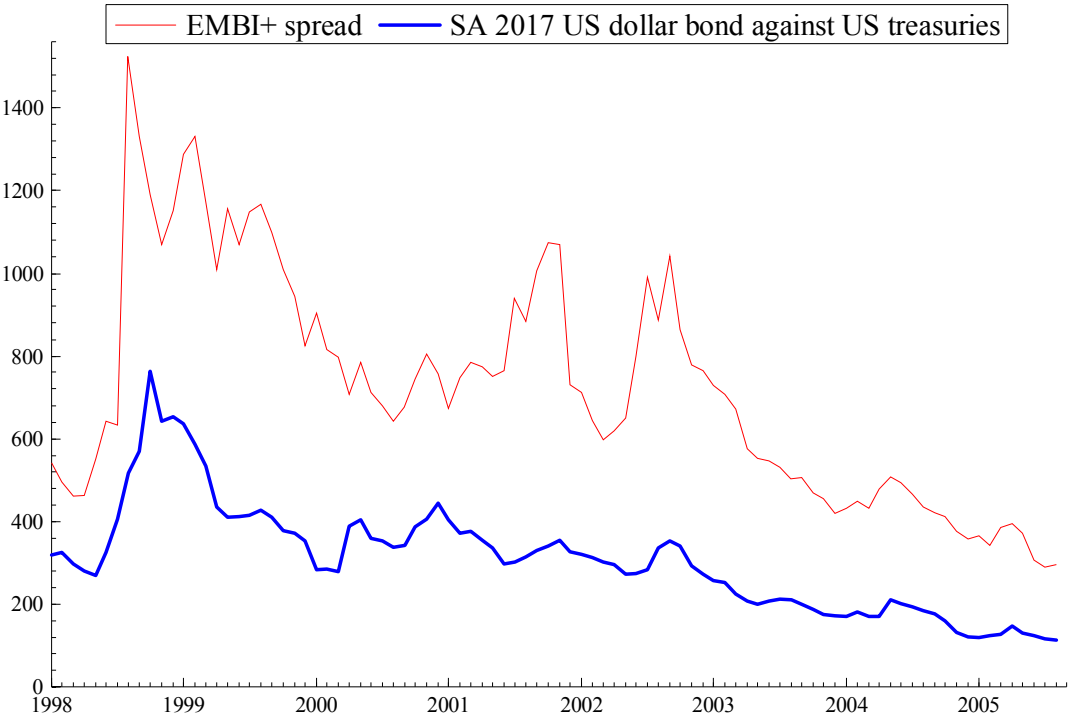
Source: A rise in the SARB's REER index denotes appreciation. The prime rate is from the IMF. The real prime is defined using the consumer price deflator and a log approximation.

Figure 8: Nominal effective exchange rate (percentage change) and the nominal prime rate



Sources: A rise in the SARB's NEER index denotes appreciation. Prime rates are from the IMF.

Figure 9: Monthly emerging market bond index and SA sovereign spreads (basis points)



Source: Monthly data in basis points, sourced from JP Morgan Chase Bank and the South African Reserve Bank. EMBI+ is the emerging market bond index spread from JP Morgan Chase. The SA bond spread is against comparable US treasuries.

APPENDIX 1: Central Bank Transparency Scores for 1994 and 2004

The scores are in brackets and bold, based on the original Geraats survey to allow direct comparison with several OECD countries (Eijffinger and Geraats, 2006).

1. Political Transparency

(a) Is there a formal statement of the objective(s) of monetary policy, with an explicit prioritization in case of multiple objectives?
No formal objective(s) = 0.
Multiple objectives without prioritization = 1/2.
One objective, or multiple objectives with explicit priority = 1.
(b) Is there a quantification of the primary objective(s)?
No = 0. Yes = 1.
(c) Are there explicit institutional arrangements or contracts between the monetary authorities and the government?
No central bank, contracts or other institutional arrangements = 0.
Central bank without explicit instrument independence or contract = 1/2.
Central bank with explicit instrument independence or central bank contract (although possibly subject to an explicit override procedure) = 1.

1.a "The primary objective of monetary policy is to protect the value of the currency in order to obtain balanced and sustainable economic growth in the country." This objective is articulated in both the Constitution Act of the Republic of South Africa, No 8 of 1996 (section 224) and in the amended South African Reserve Bank Act, No 90 of 1989 (section 3 substituted by section 2 of Act 2 of 1996). "It requires the achievement of financial stability, i.e. price stability as well as stable conditions in the financial sector as a whole." "The new inflation-targeting monetary policy framework is primarily concerned with one element of financial stability, i.e. price stability." Both quotes from Appendix to the Statement of the Monetary Policy Committee (MPC) - 6 April 2000: " A New Monetary Policy Framework", Statement issued by Mr. T.T. Mboweni, Governor of the SARB (website). The score in 2004 is **[1]**. Under Stals, an initial mission statement, published in 1990, entrusted the protection of the domestic *and* external value of the Rand to the Bank. This was carried through to the Interim Constitution (commencing in late April, 1994): "The primary objectives of the South African Reserve Bank shall be to protect the internal *and* external value of the currency in the interest of balanced and sustainable economic growth in the Republic." This can be interpreted as having both a price and an exchange rate target in mind, without explicit prioritisation. Money supply growth guidelines superceded strict targets by the early 1990s and an eclectic monetary policy with an informal inflation target from the middle 1990s. Despite statements that the rand was freely floating, *de facto* there were clear episodes of heavy intervention in the foreign exchange market to prevent appreciation and at times depreciation of the rand. There were multiple and conflicting objectives for monetary policy – see section 4.3 above. The score for 1994 is **[1/2]**.

1.b The SARB conducts monetary policy within an inflation targeting framework with clear targets. The score for 2004 is **[1]**. The score for 1994 is **[0]**. Monetary guidelines had replaced the monetary targets and were exceeded in each year. The eclectic monetary policy remained opaque: it was not clear what weights attached to the broader indicators (see Aron and Muellbauer, 2002b).

1.c Constitutional independence of the SARB was enacted in 1996: Section 224 (2) of the Constitution states: "The SARB, 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." Operational independence was achieved initially through an exchange of letters between government and Bank. The score in 2004 is **[1]**. At the beginning of 1994, the score is **[0.5]**. Operational responsibility was described by the South African Reserve Bank Act (No 90 of 1989). But before the Interim Constitution was adopted there were no explicit arrangements or contracts between the government and the SARB on instrument independence. The Interim Constitution (Act 200, 1993, assented to on 25 January, 1994, commencing on 27 April, 1994) gives multiple objectives to the SARB, but states it shall perform its functions independently.

2. Economic Transparency

(a) Is the basic economic data relevant for the conduct of monetary policy publicly available? The focus is on the following five variables: money supply, inflation, GDP, unemployment rate and capacity utilization.
Quarterly time series for at most two out of the five variables = 0.
Quarterly time series for three or four out of the five variables = 1/2.
Quarterly time series for all five variables = 1.
(b) Does the central bank disclose the formal macroeconomic model(s) it uses for policy analysis?
No = 0. Yes = 1.
(c) Does the central bank regularly publish its own macroeconomic forecasts?
No numerical central bank forecasts for inflation and output = 0.
Numerical central bank forecasts for inflation and/or output published at less than quarterly frequency =1/2.
Quarterly numerical central bank forecasts for inflation and output for the medium term (one to two years ahead), specifying the assumptions about the policy instrument (conditional or unconditional forecasts) = 1.

2.a Money supply, inflation, GDP, employment figures and capacity utilisation data are available from the website and published at least quarterly (except for GDP, all other series are also monthly) back to at least 1970. The CPI-X data are published monthly from 1997. Comparable unemployment rate data from 1994 are available at 6-month intervals from http://www.statssa.gov.za/, to 1993 on a narrow definition of unemployment; and further back annually, though on a very narrow definition from the ILO website. Applying the Geraats test *strictly*, the limited labour data implies a score of **[0.5]** in 1994 and 2004.
2.b The SARB model has been reconstructed since about 1999 with assistance from the Bank of England and others. It is still under development and has not been published (though there are plans to do so). Prior to inflation targeting, various Quarterly Bulletin articles revealed parts of the SARB's large (400-equation) model, but it was never published as a whole. The score in is **[0]** in both 1994 and 2004.
2.c The *Monetary Policy Review* is published twice annually (see website), and contains an inflation forecast up to 2 years ahead in the form of a fan chart. No detail is given on the underlying assumptions, except that the repo rate is assumed unchanged for the forecast period. There are no forecasts for output. No forecasts were published in the Stals era. The score is **[0]** in 1994 and **[0.5]** in 2004.

3. Procedural Transparency
(a) Does the central bank provide an explicit policy rule or strategy that describes its monetary policy framework?
No = 0. Yes = 1.
(b) Does the central bank give a comprehensive account of policy deliberations (or explanations in case of a single central banker) within a reasonable amount of time?
No, or only after a substantial lag (more than eight weeks) = 0.
Yes, comprehensive minutes (although not necessarily verbatim or attributed) or explanations (in case of a single central banker), including a discussion of backward and forward-looking arguments = 1.
(c) Does the central bank disclose how each decision on the level of its main operating instrument or target was reached?
No voting records, or only after substantial lag (more than eight weeks) = 0.
Non-attributed voting records = 1/2.
Individual voting records, or decision by single central banker = 1.

3.a Inflation targeting with an explicit target was adopted in 2000, and a brief description can be found in: Advertorial published by the SA Reserve Bank in Business Day newspaper: The Objectives and Importance of Inflation Targeting (2002-11-13) and Appendix to the Statement of the Monetary Policy Committee - 6 April 2000: " A New Monetary Policy Framework", Statement issued by Mr. T.T. Mboweni, Governor, SARB. The score is [**1**] for 2004. In 1994 under Stals, the monetary policy targets had given way to a range of indicators (*Quarterly Bulletin*, October, 1997). There was no explicit rule and policy was opaque (see Aron and Muellbauer, 2002b). The score is **[0]** in 1994.
3.b Decisions are reached by the Monetary Policy Committee (initially 15 and now 9 members). In 1994, decisions were made by the Governor, in consultation with the Deputy Governors. Minutes of these meetings are not published now, and were not in 1994. The score in each of 2004 and 1994 is [**0**].
3.c No voting is carried out in the MPC. In 1994, decisions were reached by the Governor and his deputies, without voting or records. The score in each of 2004 and 1994 is [**0**].

4. Policy Transparency
(a) Are decisions about adjustments to the main operating instrument or target promptly announced?
No, or after a significant lag = 0.
Yes, at the latest on the day of implementation = 1.
(b) Does the central bank provide an explanation when it announces policy decisions?
No = 0.
Yes, when policy decisions change, or only superficially = 1/2.
Yes, always and including forwarding-looking assessments = 1.
(c) Does the central bank disclose an explicit policy inclination after every policy meeting or an explicit indication of likely future policy actions (at least quarterly)?
No = 0. Yes = 1.

4.a Policy decision changes are currently announced on the last day of the three day MPC meeting, at 3 p.m.. There is a press release and the announcement is televised. The score is thus **[1]** in 2004. In 1994, there were sometimes press announcements with explanations about rate changes, but not *every* time the rate changed. The score in 1994 is **[1]**.
4.b An explanation is currently given in the MPC statement, including when interest rates don't change, with a very brief forward-looking assessment. The score is thus **[1]** in 2004. In 1994, explanations were given on those occasions when there were press statements, which was not every time they changed. There were no explanations when it was decided to *maintain* the rate after a meeting. A generous score for 1994 is therefore **[0.5]**.
4.c There is currently no explicit policy inclination after policy meetings, nor quarterly. Nor were explicit inclinations given *at least* quarterly in 1994. The score in each case is **[0]**.

5. Operational Transparency
(a) Does the central bank regularly evaluate to what extent its main policy operating targets (if any) have been achieved?
No, or not very often (at less than annual frequency) = 0.
Yes, but without providing explanations for significant deviations = 1/2.
Yes, accounting for significant deviations from target (if any); or, (nearly) perfect control over main operating instrument/target = 1.
(b) Does the central bank regularly provide information on (unanticipated) macroeconomic disturbances that affect the policy transmission process?
No, or not very often = 0.
Yes, but only through short-term forecasts or analysis of current macroeconomic developments (at least quarterly) = 1/2.
Yes, including a discussion of past forecast errors (at least annually) = 1.
(c) Does the central bank regularly provide an evaluation of the policy outcome in light of its macroeconomic objectives?
No, or not very often (at less than annual frequency) = 0.
Yes, but superficially = 1/2.
Yes, with an explicit account of the contribution of monetary policy in meeting the objectives = 1.

5.a The main operating instrument in 2004 is the repo rate, and in 1994 was the bank rate. There is no data, graphical or other evaluation of the control of the operating target in either case. But control over the operating target in both cases has been nearly perfect. The score for each is [**1**].
5.b There is a quarterly analysis of current macro-economic developments and disturbances in the *Quarterly Bulletin*, but no discussion of past forecast errors (no forecasts were published in 1994). The score in each of 1994 and 2004 is [**0.5**].
5.c The *Monetary Policy Review* only superficially accounts for discrepancies between the policy outcome and the target. The benchmark against which this score is made, is the Swedish Riksbank comprehensive and explicit annual assessment in the Inflation Report, March issue (see Eijffinger and Geraats, 2006). The score for the SARB in 2004 is [**0.5**]. Stals in 1994 scores [**0.5**], based on his extensive speeches and explanations, which were available on the web, and in the *Quarterly Bulletin.*