# Challenges of inflation targeting for emerging-market economies: The South African case

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## 1. Introduction

The apparent successful implementation of inflation targeting in a number of countries in the 1990s led some observers to argue that it had been introduced under relatively benign conditions and that it had not as yet been tested seriously. The same cannot be said today: supply-side shocks over the past few years have proved to be a major challenge to the inflation-targeting framework. While the evidence with respect to the performance of countries that have adopted inflation targeting is generally favourable, the jury is still out on whether or not inflation targeting has passed the test of sustainability in the face of persistent shocks.

At present there are 23 inflation-targeting countries, of which 16 are classified as emerging-market economies. Figure 1 shows that most inflation-targeting countries are now outside their target ranges. The true test of

Figure 1: Inflation targets and outcomes in selected inflation-targeting countries (2008)
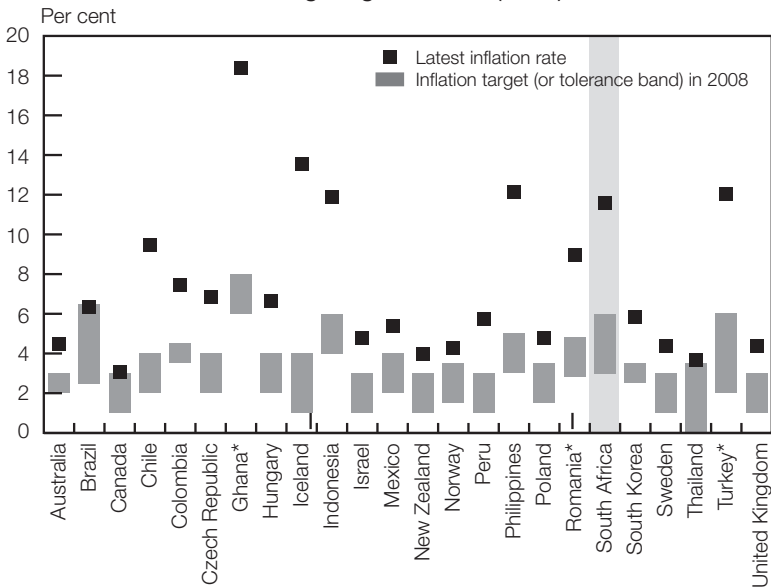


* Year-end target

Source: Various national central banks and statistical offices

the framework will be whether these countries can bring inflation back to their targets over a reasonable time horizon. Not everyone is confident about the outcome. In a recent critique of inflation targeting, Joseph Stiglitz (2008) noted that "[t]oday, inflation targeting is being put to the test – and it will almost certainly fail". Nevertheless, to date no country that has adopted an inflation-targeting framework has abandoned it.

Inflation targeting has not been without its critics, and the criticisms have ranged from allowing too much discretion or, alternatively, for being inflexible, particularly within the emerging-market or developing-economy context where greater flexibility is required to deal with exogenous shocks and where the trade-offs are generally more acute. In this vein, critics contend that the focus on inflation is at the expense of long-run economic growth and/or short-run output variability; or that the inability to deal with shocks inevitably leads to procyclical monetary policy with resultant magnified economic cycles. Stiglitz (2008) has suggested that in trying to contain inflation, the "cure would be worse than the disease".[1] Finally, inflation targeting is regarded as being inappropriate for developing or emerging-market economies because very few of these countries can comply with the prerequisites for its successful introduction.

This paper attempts to address these issues, emphasising that, given the volatile environment emerging markets face, the flexibility of the framework offers distinct advantages compared to other alternatives. However, the challenge is often to balance this flexibility with monetary policy credibility.

The paper is structured as follows: first it deals with some theoretical issues relating to inflation targeting: what it is and issues of flexibility. The next section focuses on emerging-market economies, the challenges they face in operating within an inflation-targeting framework and the prerequisites for the implementation of inflation targeting. Next the issue of dealing with shocks within a targeting framework is examined, followed by an assessment of South Africa's experience.

## 2. What is inflation targeting?

The distinguishing feature of inflation targeting is that there is a pre-announced target for inflation that defines the goal of monetary policy and provides a benchmark for the accountability of the central bank. Other features involve the use of a number of economic variables for making policy decisions, and a general commitment by society and government that price stability is the ultimate target of monetary policy. Some features of inflation targeting have become common to other monetary frameworks. In particular, transparency and communication, the hallmarks of the inflation-targeting framework, are no longer unique to it. Similarly, while all inflation-targeting central banks are explicitly forward-looking in

formulating monetary policy with reliance placed on inflation forecasts, this has become more widespread.

There is no unique way of implementing inflation targeting and application varies across countries. For example, there are differences in the nature of communication and degree of transparency. Recent developments in transparency involve the provision of the central bank's projection of the interest rate path (e.g. in New Zealand, Norway, Sweden and Iceland) which is used in their forecasting models; others use market forecasts (e.g. United Kingdom (UK)) or assume an unchanged interest rate path (e.g. South Africa).

Operationally, there are also differences in the levels and specifications of the targets. While most countries specify a point target, usually with a tolerance level around it, some specify a band. Some require inflation to be within the target at all times (e.g. the UK and South Africa), while others require *expected* inflation to remain within the target over the medium term (e.g. Australia and New Zealand). Differences also emerge when specifying a policy time horizon and the length of the horizon. Some targeters have an explicit escape clause, explanation clause or caveat that provides for deviations from the target under certain circumstances, usually in the event of supply-side shocks.

Some countries do not regard themselves as official targeters, yet bear many of the characteristics (e.g. Switzerland and the euro area). The distinction between targeters and non-targeters has become so blurred at times that Mervyn King (2005: 13), Governor of the Bank of England, has argued that "any coherent policy reaction found can be described as inflation targeting". Most monetary policies try to achieve a low-inflation environment. By making the target explicit, inflation targeting helps to manage or anchor inflation expectations. Inflation expectations do not automatically become anchored as a result of the announcement of the target; credibility has to be built up through successful application of monetary policy. Once achieved, well-anchored inflation expectations help to reduce the cost of reacting to deviations from the target.

## 3. The flexibility of inflation targeting

Emerging markets are more susceptible to shocks than advanced economies and they therefore require greater flexibility in responding to these shocks. The critical questions are: does the framework allow for too much or too little discretion and is the focus on inflation to the exclusion of other objectives?

The time-inconsistency theory of optimal monetary policy (Kydland and Prescott, 1977) showed that if too much discretion were allowed in the

conduct of monetary policy, there would be an inflationary bias in the economy. The fact that monetary authorities know that they could achieve real output effects by surprising the market means that market participants would anticipate this possibility, and wages and prices would be set accordingly. To overcome this, Rogoff (1985) proposed an independent and conservative central banker who would put a greater weight on inflation than does society. Economic agents would factor this into their wage and price settings. Inflation would remain under control, but the consequence would be higher output variability.

Has inflation targeting, in fact, produced the conservative central banker or what Mervyn King coined the 'inflation nutter' who eschews other economic objectives? There are divergent views. For example, Blanchard (2003) and Stiglitz (2008) argue that inflation targeting unnecessarily constrains growth because of its narrow focus and lack of discretion, while others (e.g. Genberg, 2001 and Buiter, 2006) argue that because it allows too much discretion, it cannot be expected to anchor expectations.

Inflation targeting can be seen as a compromise of the 'rules-versus-discretion' debate: Bernanke et al. (1999), for example, characterise inflation targeting as a framework of "constrained discretion". Some argue that this is both its weakness and its strength. Unlike the pure rules-based case which allows for no flexibility, inflation targeting defines a broad rule, but allows for some discretion which is constrained by the basic rule. The flexibility can change, depending on circumstances. This could, however, detract from the predictability of the framework. It has also been suggested that an inflation-targeting framework may give too much discretion in countries with weak institutional environments and this would lead to unfavourable macroeconomic outcomes. Mishkin (2004) argues that in order for inflation targeting to constrain discretion, it has to be supported by the public and the political process.

However, rigid rules, such as a fixed exchange rate target or some form of strict monetary rule, have the drawback that they lack flexibility in the face of shocks and may induce unsustainable conditions, often manifested in some form of crisis. Such rules place the burden of adjustment on output, when faced with a shock. The extreme or 'strict' version of inflation targeting would suffer from the same drawback.

## 4. Inflation targeting and output

An important consideration is whether or not inflation targeting places too much weight on the inflation objective at the expense of other possible objectives of monetary policy. Some have suggested that monetary policy should promote growth or employment, yet there is little evidence that there is a *long-run* trade-off between monetary policy and economic

growth. Growth is determined by a range of real variables. These include the quantity and productivity of labour, capital, land and infrastructure in the economy, and the general regulatory environment, including the efficiency of government and the judicial system. External factors, such as the terms of trade, are also relevant. However, in the medium term, good monetary policy can provide a stable environment conducive to long-term growth. Aron and Muellbauer (2007) note that a large body of economic theory suggests that high uncertainty impedes investment, and there is a negative link between inflation volatility and growth. Therefore, if monetary policy can lower volatility and uncertainty, this could support long-run growth, productivity and welfare.

There is, however, a short-run trade-off between inflation and output (or deviations from potential output). The academic literature generally characterises inflation targeting as the assignment of an objective function of the following form, which illustrates this trade-off between inflation and output variability (e.g. Walsh, 2003 and Svensson, 2002):

$$L_t = E_t \sum_{i=0}^{\infty} \beta^i \left[ (\pi_{t+i} - \pi^T)^2 + \lambda(y - y^*)^2_{t+i} \right]$$

The loss function, $L$, to be minimised reflects expected deviations of inflation ($\pi$) from the inflation target ($\pi^T$) and the expected deviation of output $(y)$ from potential output $(y^*)$ (the output gap). The greater the deviation from the inflation target, the more costly it will be and the more strongly monetary policy is likely to react. $\lambda$ represents the weight assigned to achieving the output gap objective *relative* to the inflation objective. If $\lambda = 0$, then one has a 'strict' inflation targeter, where all weight is put on the inflation objective and therefore one would expect increased output variability. Any weight on output ($\lambda > 0$) describes what is referred to as a flexible inflation-targeting regime. It is generally agreed that there are very few central banks, if any, that act in the strict sense. In other words, there is a concern about the amplitude and length of the business cycle.

Inflation-targeting banks do not usually use such a loss function in practice. However, as noted by Svendsen et al. (2004) and Smets (2000), the choice of the monetary policy horizon implicitly provides an indication of the size of $\lambda$. Strict inflation targeters would choose as short a time horizon as possible within the constraints of the lag of monetary policy, while more flexible central banks would have a longer target horizon. The target horizon may also be extended in the face of shocks that would have a strong negative output effect.

While a focus on the time horizon is a simplification of the loss function above, it is easier to evaluate and is more easily operationalised. Several

central banks apply this approach, either using an escape clause or specifying some flexibility in the length of the policy time horizon. Given a lag between monetary policy and its full impact on inflation, most central banks specify a horizon of between 18 and 24 months, often with provision for extending this horizon. For the Norges Bank, for example, the relevant horizon "will depend on disturbances to which the economy is exposed and how they affect the path for inflation and the real economy ahead". Similarly, Charles Bean (2003: 17) of the Bank of England has noted that "the two-year point (time horizon) makes a convenient reference point for the purposes of communication. But . . . there is no mechanical link between the central projection at the forecast horizon and the policy decision. The latter may also be affected by the balance of risks, i.e. the skewness of the probability distribution, what is happening to inflation both before and beyond the two-year horizon and what is happening to activity."

Countries using explicit escape clauses or caveats, which allow for deviations from the target as a result of supply-side shocks, include New Zealand, Iceland and the Czech Republic. However, these clauses do not suspend or change the target. Rather, they allow for a deviation from the target and implicitly allow for the lengthening of the time horizon. The ultimate focus remains the inflation target.

South Africa too adopts a flexible medium-term focus, as exemplified in the 'explanation clause':

> When the economy is buffeted by a supply side shock similar to those envisaged by the original escape clause that will take CPIX inflation outside the target range (e.g. an oil price shock, a drought, a natural disaster, 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. (Republic of South Africa, 2003: 31.)

This clause implicitly allows for inflation to be out of the target as a result of first-round effects of a supply shock and for the Bank to define the time horizon for restoring inflation to within the target range. It does not permit a respecification of the target, nor relieve the Bank of its responsibility with respect to returning to the target range. Instead, the implied flexibility allows for interest rate smoothing over the cycle, which may mitigate any output variability from the monetary policy response to the shock.

This flexible time horizon imparts a degree of flexibility to the inflation-targeting framework to deal with exogenous shocks. However, this discretion is not absolute and is constrained by how well inflation expectations are anchored which, in turn, is a function of past credibility. A high degree of credibility, usually gained through a history of low inflation and

appropriate monetary policy actions, permits a more moderate monetary policy response, a longer time horizon and a lower output loss. Conversely, central banks with low credibility often have to respond more strongly as expectations would not be well anchored. In the early days of an inflation-targeting regime, central banks are more likely to be on the 'strict' side of the spectrum (i.e., $\lambda \approx 0$), (see Batini and Laxton, 2007, and Kahn and Farrell, 2002). Once credibility is built up, monetary policy may have more flexibility. With low credibility, failure to respond appropriately could cause an acceleration of inflation from the target, as expectations of second-round effects take hold.

Even if a central bank does not have an explicit concern for output variability, the output gap is one of the determinants of inflation and hence has an important impact on monetary policy, along with other variables. This relationship results automatically in a countercyclical monetary policy stance, unless other factors override this. Thus, even if monetary policy does not have an explicit growth objective, the state of the economy relative to potential influences the inflation outlook and hence monetary policy responses.

Nevertheless, Walsh (2008) notes that the fear that real variables will be neglected at the expense of inflation stabilisation is conceptually well founded. He argues that the theory of performance measures suggests that individuals and institutions do tend to focus on the yardstick on which their rewards are based. But even in societies with a strong aversion to inflation, where there are genuine trade-offs to be faced, society may prefer a more flexible approach from the central bank. Furthermore, despite a clear mandate, few central bank governors would want to be remembered for killing inflation and the economy.

## 5. Emerging-market economies and inflation targeting

Fraga et al. (2003) present data up to 2002 suggesting inflation-targeting emerging-market economies performed less well than developed economies. However, they ascribe this to the fact that inflation targeting is more challenging in emerging markets rather than to a lack of commitment to the targets.

Should a more challenging environment discourage the adoption of inflation targeting or is this an appropriate framework for dealing with such vulnerabilities and challenges? It is important to distinguish between preconditions, which may be more difficult and more costly for emerging-market economies to put in place, and their greater vulnerability to exogenous shocks.

Various preconditions or requirements are seen as essential for the successful implementation of inflation targeting, and relate to rectifying institutional weaknesses, lack of credibility and lack of technical capabilities (see Masson et al., 1997; Schaechter, Stone and Zelmer, 2000; Fraga et al., 2003; Batini and Laxton 2007; and Mishkin, 2004). It is also necessary to have a relatively well-developed financial system to facilitate the effective transmission of monetary policy.

Batini and Laxton (2007) suggest that it is not necessary for all the requirements to be met fully before the implementation of inflation targeting. They conclude that the feasibility and success of inflation targeting depend more on the authorities' commitment, and ability to plan and drive institutional change after the introduction of the new framework. In fact, the introduction of inflation targeting has, in a number of emerging markets, led to a rapid improvement of institutional structures and technical capabilities.

## 5.1 Central bank independence

Key institutional requirements include central bank independence, and a public and institutional political commitment to the inflation objective of the framework. The focus on central bank independence relates to instrument-independence. From a political economy perspective, it is desirable that the goal of monetary policy be set by democratically elected governments. But once set, the mandate should be given to central banks with independence to implement monetary policy in order to avoid the time-inconsistency problem or a political monetary policy cycle.

But independence is almost irrelevant if there is not a general commitment to the framework to give it legitimacy. Mishkin (2004: 11) argues that writing the mandate into law is not necessarily required, or indeed in some cases is not necessarily sufficient, as "laws may matter less than the general public and politicians' commitment to support price stability. Here past history matters. Many emerging-market countries have had a history of poor support for the price stability goal and since laws are easily overturned in these countries, it is not clear that laws will be sufficient."

This commitment to price stability is critical. If government changes the target each time the central bank has to implement unpopular measures, the underlying advantages of inflation targeting, of building credibility and predictability, and the anchoring of expectations will fall away. An institutional structure that lacks this commitment could, in effect, result in a transfer of monetary policy discretion to the government and a return of the time-inconsistency problem. For this reason, transparency and good communication skills are especially needed by central banks in 'politically complicated' environments. Yet even excellent communication may not be

enough if the political environment is not conducive to supporting an inde-pendent central bank that focuses on inflation control (Mishkin, 2004). However, an excessive focus on inflation without regard to real output vari-ability could undermine independence as government may move to reduce the degree of independence (Mishkin, 2008).

In South Africa instrument-independence is constitutionally guaranteed. The Bank does not have goal-independence, since the goal of monetary policy is set by government in the form of the target. While the institutional requirement is guaranteed, it is not necessarily the case that a high weight is placed on price stability by the public or some politicians.

## 5.2 Fiscal dominance

A further challenge facing emerging-market economies relates to the extent of fiscal dominance in the economy (Masson et al., 1997, and Batini and Laxton, 2007). The demands for social expenditure are usually more pressing in developing economies with narrow tax bases. If central banks are forced to monetise the debt of governments, the ability of monetary policy to focus on inflation will be undermined. However, the adoption of inflation targeting could help promote fiscal and financial reforms, and make it harder for government to advocate loose fiscal policy that is clearly inconsistent with the inflation target.

Fortunately, in South Africa fiscal policy has been disciplined and sup-portive of the inflation-targeting framework (Ajam and Aron, 2009). In more recent years small surpluses have been achieved. Although fiscal policy has at times been relatively procyclical (Du Plessis et al., 2008; Swanepoel, 2004), it has not impinged negatively on monetary policy. Monetary policy has not had to act to offset fiscal policy actions that could potentially undermine the monetary policy stance.

## 5.3 The economic structure

Batini and Laxton (2007) identify the economic structure as an important requirement for successful inflation targeting. They note that prices should be deregulated fully and that the economy should not be overly sensitive to commodity price and exchange rate changes. Furthermore, if prices are generally administered, inflation control is rendered less effective.

The issue of sensitivity to commodity prices and exchange rates will be revisited in section 6 of this paper. Although the need for full deregulation of prices is probably an overstatement, monetary policy should be able to influence a significant proportion of the price index. The pervasiveness of administered prices, which are often under the control of the fiscus, could also undermine the ability of central banks to control inflation

successfully; particularly when these prices are set without regard to underlying supply and demand conditions.

Administered prices in South Africa currently account for a substantial 20 per cent of the consumer price index excluding mortgage interest cost for metropolitan and other urban areas (CPIX) basket. Excluding petrol prices, administered prices would account for about 15 per cent of the index. Figure 2 shows that administered prices initially posed a considerable challenge due to their stickiness, a fact repeatedly referred to in Monetary Policy Committee (MPC) statements. Subsequent changes in the regulatory environment, and perhaps recognition of the importance of prices being set on a market-related basis, saw administered price inflation falling to relatively low levels between mid-2005 and the end of 2006. More recently, there has been a resurgence in administered price inflation, mainly driven by electricity price increases of around 30 per cent.

**Figure 2:   Administered price index**



Percentage change over 12 months
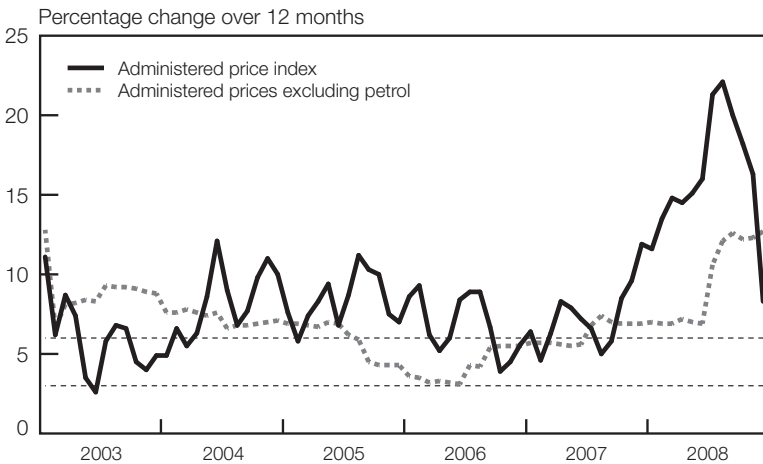
Sources: Statistics South Africa and South African Reserve Bank

## 5.4 Technical infrastructure

The inflation forecast is central to any inflation-targeting regime and requires a well-developed technical infrastructure, including quality data, and forecasting and modelling capabilities. A forward-looking inflation-targeting framework is, in fact, "inflation *forecast* targeting" (Svensson, 1997). The forecast should not be used in a mechanical way, but it does nevertheless provide an important guide to policy.

The lack of technical capabilities can be overcome with appropriate, focused and targeted training, as well as technical assistance from other central banks. When South Africa moved to inflation targeting, the Bank's

forecasting models were still in their infancy. Valuable assistance and peer review were rendered by a number of central banks, including those from Canada, Sweden and the UK. Model development remains a continuous process and collaboration between central banks has become widespread.

Data deficiencies, however, are more problematic as emerging markets often lack extensive and accurate time series. Former centrally planned economies in central and eastern Europe faced particular problems. Although they had long time series in some instances, the extent of the structural change was so profound that the data were generally useless for modelling and forecasting purposes. Even price series were of no value, given the pervasive regulation of prices. A related issue is the measurement of the output gap, which is central to most conventional inflation forecasting models. The output gap is unobservable and has to be estimated. This is a challenge even in countries with good data and limited structural change over time. The Czech Republic, which adopted inflation targeting in 1998, overcame these problems by using dynamic stochastic general equilibrium (DSGE) models that require calibration rather than long time series.

## 6. External volatilities or vulnerabilities

The impact of exchange rate changes on inflation and the real economy are generally larger in emerging economies, and their exchange rates are more prone to overshooting. Emerging economies are also vulnerable to terms-of-trade swings and 'sudden stops' of capital inflows (see, for example, Calvo and Reinhart, 2000), driven by fundamentals or contagion effects from risk-averse investors.

Large exchange rate movements might have significant real effects, especially where levels of foreign currency-denominated liabilities are high. Depreciation by increasing the domestic currency value of this debt could undermine financial stability. Several countries therefore tend to resist exchange rate changes – the so-called fear of floating (Calvo and Reinhart, 2002). However, reacting to exchange rate changes can create confusion about the objectives of monetary policy and the commitment to the inflation target, particularly when a conflict between the objectives arises. An inflation-targeting framework requires exchange rate flexibility, although Ho and McCauley (2003) note that some intervention is not inconsistent with the framework, as long as the motives are fully communicated and understood, and that precedence is given to the inflation objective when a conflict between the objectives arises.

The monetary policy reaction to exchange rate changes that are seen to be inflationary could pose a challenge for communication. It needs to be clarified that the reaction is to the inflationary impact of the exchange rate

change and not an attempt to target the exchange rate. The exchange rate is one of a number of determinants of inflation, so any response to an exchange rate change would have to be assessed in conjunction with the simultaneous impact of changes in other variables, some of which may be offsetting.

Emerging markets also tend to have a higher pass-through from exchange rate changes to domestic inflation, because of lower credibility of monetary policy, less competitive markets and a relatively higher proportion of traded goods in the consumer basket (Eichengreen, 2001). Thus, the exchange rate is often the focal point of inflation expectations. However, several studies have found that the extent of the pass-through is regime-dependent and has declined in a number of inflation-targeting countries, including South Africa (Mihaljek and Klau, 2008; Rigobon, 2007). The extent of the pass-through is also complicated by the possibility of non-linearities or threshold effects in the response of inflation to exchange rate changes.

The appropriate response to exchange rate changes in an inflation-targeting environment depends on the nature of the shock (Eichengreen, 2001; Jonas and Mishkin, 2002). A purely monetary shock, where the exchange rate is driven by fundamentals, would require an interest rate response. A portfolio shock or 'sudden stop', which emanates from international financial markets, would require a monetary policy response. The size of the response would be determined by the expected sustainability of the shock and the expected impact of the exchange rate change on inflation. Eichengreen (2001) also identifies a 'Prebisch shock', where the exchange rate reacts to a change in the terms of trade or export demand. In this instance there are two offsetting effects on inflation. In the event of a terms of trade deterioration, the weaker exchange rate will cause domestic inflation to rise, but the lower aggregate demand will be deflationary. Should the second effect dominate, the appropriate response would be to lower interest rates. Simply tightening monetary policy in response to a depreciation under these circumstances may lead to procyclical monetary policy.

The significant depreciation of the South African rand in the final quarter of 2001 provided the first real challenge to the South African targeting regime. Monetary policy was adjusted in 2002 as the forecasts showed a strong pass-through from the exchange rate to inflation. The repurchase (repo) rate was increased by 100 basis points on four occasions during 2002. CPIX inflation peaked in September 2002 at a level of 11,3 per cent and returned to within the target range by September 2003.[2]

The response of the MPC was not an attempt to stem the depreciation and the initial monetary policy response was only on 15 January 2002

after the rand had stabilised somewhat. The response was directed at the expected increase in inflation, which had fed through strongly to gener-alised price increases. Consistent with the forward-looking application of monetary policy, the interest rate cycle was reversed in June 2003 on the basis of the expected return of inflation to within the target range.

## 7. Dealing with supply-side shocks

Supply-side shocks provide a particular challenge to monetary policy. This section elaborates on this issue and characterises different types of shocks. Based on simulations for the South African economy, it shows how a flexible monetary policy could respond differently to these types of shocks.

The problem of dealing with supply-side shocks is not unique to inflation targeting. Fixed exchange rate systems are particularly vulnerable to such shocks and adjustments have to be made, either in terms of output or through real exchange rate changes (i.e., a change in the price of non-tradeables), with possible implications for the sustainability of the peg.

Frankel et al. (2007), in their review of the South African macroeconomic policy environment, are critical of the inflation-targeting framework on the grounds of its supposed inflexibility in the face of shocks. In particular, they argue that the response to supply-side shocks leads to procyclical monetary policy. For example, a sharp increase in the international oil prices would cause headline inflation to increase, requiring a tighter monetary policy response at a time when the higher oil prices would already be moving output in the opposite direction. However, they implicitly assume that monetary policy would respond in the same way, irrespective of the *nature* of the shock. Importantly, along with others, including Stiglitz (2008), they also implicitly assume a 'strict' inflation-targeting framework. The empirical evidence, as discussed in section 9, shows that there was only evidence of some procyclicality in 2004 and 2005.

It is generally accepted that while central banks should respond to demand shocks, there is very little that can be done about the first-round effects of supply-side shocks. Monetary policy, however, needs to be concerned with the possible impact on inflation expectations and the emergence of second-round effects. This focus would allow the monetary authorities to look through the impact effect of the shock and, depending on the extent to which inflation expectations are anchored, also take a more flexible approach by extending the policy time horizon. The reaction will also be determined by the nature and duration of the shocks, although they are not always easy to discern *ex ante*. The countervailing impact on prices as a result of a widening output gap will also need to be taken into account.

The challenge for forward-looking monetary policy-makers is to distin-guish *ex ante* between three broad categories of commodity price

shocks: (1) those of relatively short duration (prices are mean reverting); (2) those that involve one-off relative price adjustments that are then sustained at the new levels; and (3) those that involve a sustained increase in the price of the commodity over a number of years, for example, raised international oil price behaviour between 2004 and 2008.

The first case – that of a short-term shock – requires little, if any, monetary policy reaction. This is particularly the case if there is a high degree of monetary policy credibility and if it is generally accepted that the shock is temporary (e.g. in the case of a supply disruption). In this case there would be an increase in the headline inflation rate (depending on the weight of the commodity in the index), followed by an undershoot of inflation when the price falls back to its original level. Inflation then returns to more or less its original level. Core inflation under these circumstances should be relatively unaffected, but this would depend on the credibility of monetary policy.

To illustrate the point, following Blinder and Rudd (2008), the Bank's core model was shocked, assuming a 30 per cent increase in the international oil price, which peaks after a year and returns to its original level a year later (assuming for simplicity that there is an even distribution over the period). The outcome, seen in Figure 3a, shows that headline inflation increases, then declines (the inflationary shock turns into a deflationary shock) and finally returns to more or less its original level. The impact on core inflation (defined here for simplicity as CPIX excluding administered prices[3]) is relatively muted, since there is some, although limited,

**Figure 3a:  Short-term temporary increase in the oil price**
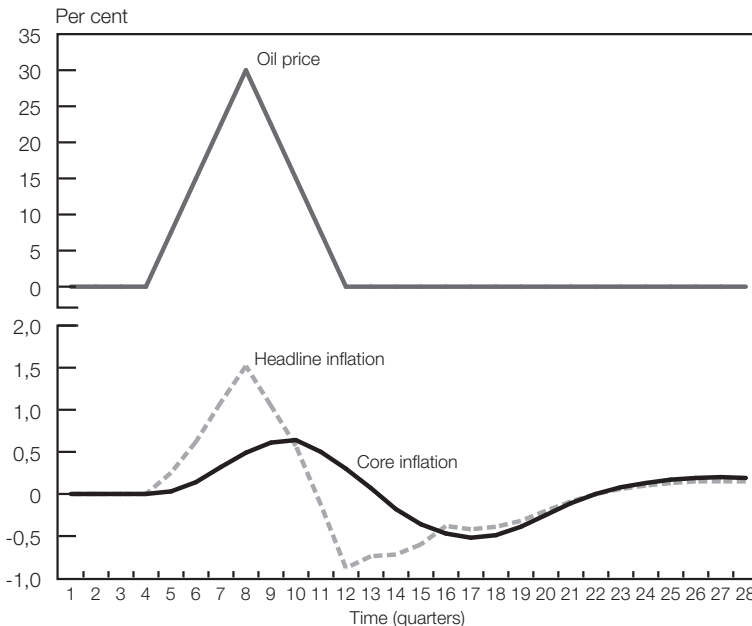
pass-through to headline inflation. The impact on inflation beyond eight quarters is relatively small. A policy focus on core inflation, or 'looking through the spike', should call for a relatively unchanged monetary policy stance. This result depends on perfect foresight as to the duration of the shock, as well as a high degree of credibility of monetary policy so that second-round effects are not generated.

If there is a monetary policy reaction, lags in monetary policy mean that by the time the tighter stance of monetary policy takes effect, it will be acting in the wrong direction. This case underscores the point that an inflation-targeting policy, or any monetary policy for that matter, needs to focus on the medium term and not be concerned about short-run deviations of inflation from the target.[4]

In the second example the model is shocked with a 30 per cent increase in the oil price and this is a permanent relative price change (Figure 3b). The impact here is quite different and the policy response is less straight-forward. Theoretically, the direct contribution to headline inflation should dissipate over time, with core inflation being more muted. In the simulation, headline inflation increases quickly and then declines quite rapidly after a year. However, as in the Blinder–Rudd simulation, headline inflation remains persistently higher than before the shock. Thus, the policy response is more ambiguous and will depend on the initial persistence of inflation, and the second-round effects following this increase in

**Figure 3b: One-off permanent increase in the oil price**
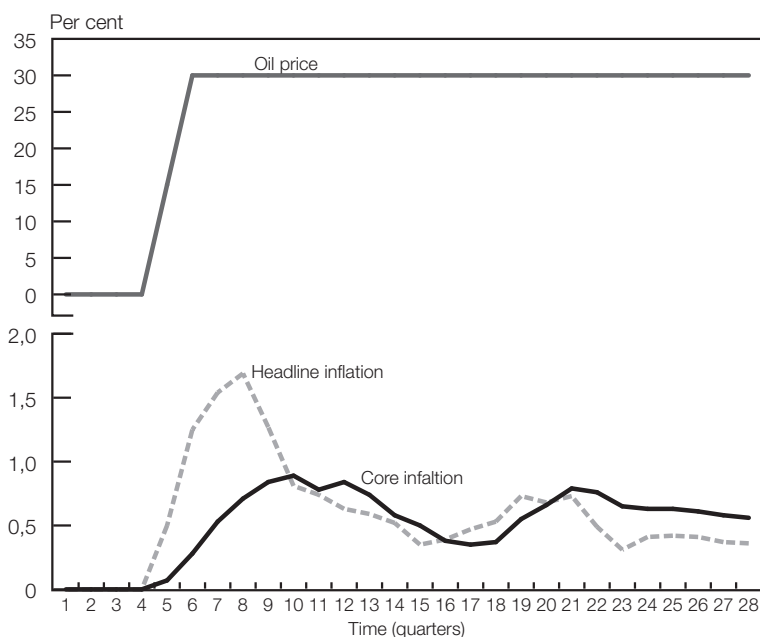
inflation. If monetary policy accommodates fully the increase in relative prices, then higher inflation dynamics could evolve and eventually a monetary response may be required.

The third case is a gradual, long-lasting persistent increase in relative prices. Relative price changes cannot increase indefinitely, but with a pro-tracted increase it is not obvious when and at what level this process will end. Recent events in the international oil markets have also shown that these relative price adjustments, which were thought to be permanent, can also reverse and very quickly. For illustrative purposes a 5 per cent gradual and persistent increase in the international oil price has been assumed (see Figure 3c). The simulation shows that, while core is more muted than headline inflation as expected, both show a persistent increase and, in this case, a monetary policy response is called for.

**Figure 3c:  Gradual and persistent increase in the oil price**
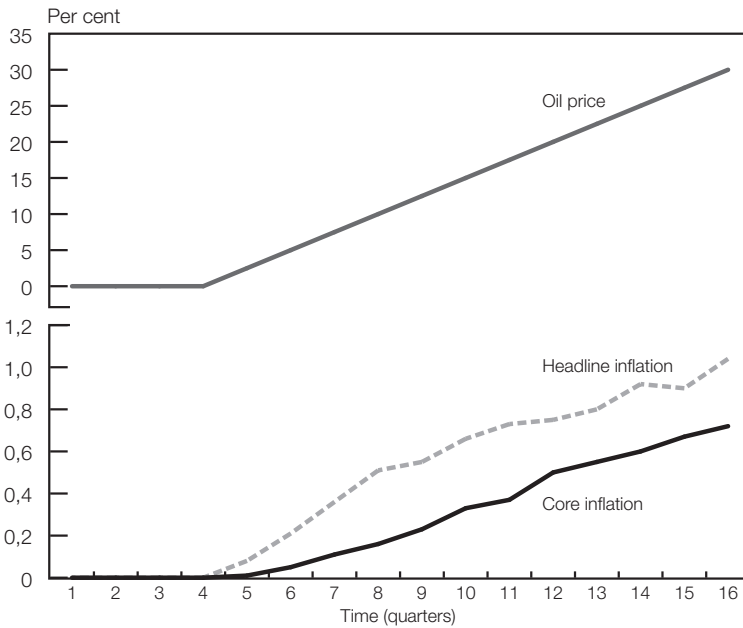


The story is complicated by the fact that supply-side shocks may lead to offsetting effects on the demand side. As discussed earlier, a higher oil price may cause real incomes to fall, and the output gap could increase. Furthermore, if demand for oil is inelastic, expenditure on other goods will decline further. The monetary policy reaction would have to take all these countervailing effects into consideration.

The monetary policy reaction will determine to an important degree the extent to which the supply-side shock impacts on real output and

inflation. If monetary policy remains unchanged and accommodates the shock, the impact on inflation will be larger with smaller effects on output and employment. However, in cases 2 and 3, in particular, failure to respond may require even stronger monetary policy responses in the future, if expectations become unanchored and strong second-round effects ensue.

The above scenarios assume an unchanged monetary policy stance. In summary, in case 1 monetary policy could accommodate the shock because it is temporary. There is no need for monetary policy to be tightened. In case 2, inflation does not fully disappear because of the presence of second-round effects. This would require monetary tightening if the central bank did not wish to see permanent inflation effects. In the final case a stronger monetary response may be required. As noted, the problem facing monetary policy in this case is to try and anticipate the extent and duration of the relative price increase, and the extent of the second-round effects.

The experience of monetary policy in South Africa in identifying the nature of shocks is illustrative. As seen in Figure 4, international oil prices began to increase from US$30 per barrel in January 2004; a trend that was initially thought to be temporary. The price then appeared to settle in the US$60–US$70 per barrel range for some time, as in a type 2 shock. From the beginning of 2007 the price began to increase persistently (a type 3 shock or perhaps a series of type 2 shocks). Statements of the MPC since February 2007 illustrate that oil price increases continuously

**Figure 4:   International oil price**

US dollar per barrel



Brent crude: Monthly average
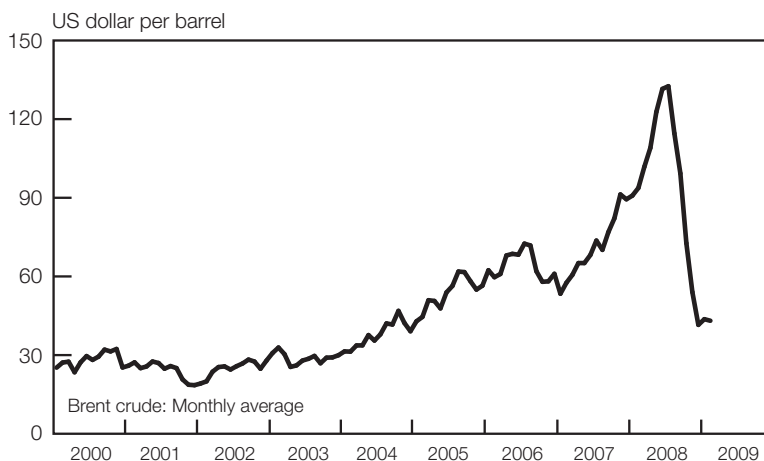
Source: IMF *International Financial Statistics* and South African Reserve Bank

surprised on the upside; also evidenced by the persistent increase in the inflation forecast. Each forecast round resulted in a higher trajectory, partly as a result of higher-than-expected oil prices, which implied a higher starting point for the forecast and a raised oil price assumption.[5]

Furthermore, market forecasts were less confident that the oil price would return to its earlier levels, and the forecasts began to take on the characteristics of types 2 and/or 3, that is, that there would be a continued increase for some time and then a levelling-off. While the type 2 assumption still helped to reduce the overall forecast in the outer years, the speed of decline was much lower than in the case of a type 1 shock.

The monetary policy reaction in South Africa to recent supply-side shocks was complicated by the concurrent strong state of domestic demand. The monetary policy stance was tightened from June 2006 as general inflation pressures began to emerge. However, it would be difficult to argue that monetary policy was reacting only to oil and food price shocks, or that it was acting in a procyclical manner. Real growth in household consumption expenditure reached a level of 9 per cent in the final quarter of 2006 and economic growth in excess of 5 per cent was significantly above the estimated potential output growth of between 4,1 and 4,5 per cent.

The unexpected persistence of the oil price increase meant that the economy was, in effect, experiencing a type 3 shock or a succession of type 2 shocks. Much of the focus of monetary policy was then on the emerging second-round effects, as evidenced in the continued increase in core inflation. Inflation expectations, which for some time had been anchored within the inflation target range, also showed evidence of increasing along with wage settlements. While expectations appeared to be no longer anchored within the target range, there was still an expectation that inflation would moderate over the next two years (see Figures 5a and 5b).

## 8. How successful has inflation targeting been?

Over the years a number of studies have been undertaken to assess the success of inflation targeting. It is often difficult to know whether the purported success of inflation targeting is a result of the framework itself, or if it is a result of a benign macroeconomic environment in the form of low volatility shocks for much of the period reviewed. As Ball and Sheridan (2005) note, there is no necessary causal link between improved inflation outcomes and inflation targeting, as all OECD countries, irrespective of their monetary policy frameworks, enjoyed lower inflation. Their study, however, gives some support to inflation targeting, as they conclude that the introduction of the framework did not make countries any worse off in terms of output volatility. The evidence generally shows (see Walsh,

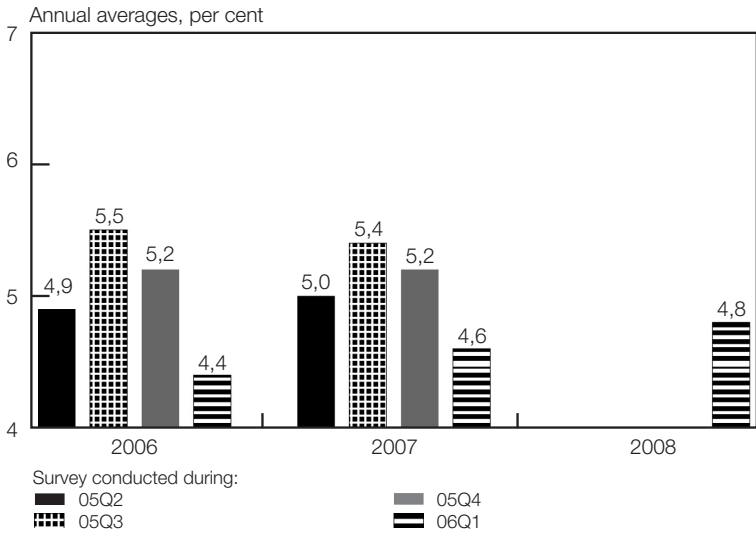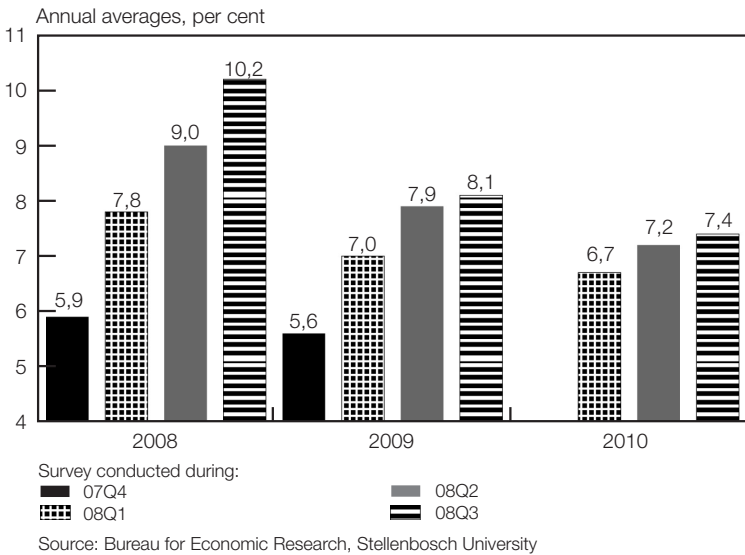Figure 5a:  BER surveys of CPIX inflation expectations

Annual averages, per cent



Survey conducted during:
■  05Q2
▦  05Q3
▨  05Q4
▤  06Q1

Source: Bureau for Economic Research, Stellenbosch University

Figure 5b:  BER surveys of CPIX inflation expectations

Annual averages, per cent



Survey conducted during:
■  07Q4
▦  08Q1
▨  08Q2
▤  08Q3

Source: Bureau for Economic Research, Stellenbosch University

2008) that inflation and economic variability have been lower in the inflation-targeting period as compared to the pre-targeting period, but that the performance of targeters is not significantly better than that of the non-targeters.

The evidence for developing or emerging-market economies is more convincing, despite the challenges faced by these countries in implementing the framework. A number of studies (Gonçalves and Salles, 2008; Walsh, 2008) show that not only has inflation targeting been associated with a reduction in inflation, it is also associated with a lowering of real output volatility (Table 1). The evidence on inflation volatility is, however, less clear. The finding on output volatility is significant, because it suggests that the general fear that inflation targeting could result in increased output volatility has been unfounded. This led Walsh (2008: 18) to suggest that inflation targeting is in fact a "free lunch".

Table 1:   Comparison of emerging-market targeters and
                 non-targeters

| Inflation | Initial inflation (per cent) | Final inflation (per cent) | Fall (percentage points) |
|---|---|---|---|
| Targeters: Mean ......................... | 17 | 5,5 | -11,4 |
| Non-targeters: Mean .................. | 13,4 | 6,9 | -6,5 |
| GDP growth volatility | Initial volatility (per cent) | Final volatility (per cent) | Fall (percentage points) |
| Targeters: Mean ......................... | 4,1 | 2,2 | -2,0 |
| Non-targeters: Mean .................. | 4,7 | 3,6 | -1,1 |

Rounding differences may influence the numbers in the final column

Source: Derived from Gonçalves and Salles (2008)

# 9. The South African experience with inflation targeting[6]

Inflation targeting was introduced in South Africa in 2000. Initially, the target was for CPIX inflation (headline inflation excluding mortgage interest costs) to average between 3 and 6 per cent to be achieved in the 2002 calendar year. This specification was subsequently changed in 2003 when the requirement was changed for the target to be achieved on a continuous basis.[7] With respect to inflation outcomes, Figure 6 shows that CPIX inflation was within the target range between September 2003 and April 2007. For most of this period, inflation was well within the target range, mostly around or below the mid-point of the target range.

With respect to inflation and output variability, if one were to compare the inflation-targeting period (first quarter of 2000 until the second quarter of 2008) with the period of the 1990s (first quarter of 1991 until the fourth quarter of 1999), one would see (Table 2) that in the pre-targeting period CPIX inflation averaged 9,7 per cent and this declined to 6,5 per cent in the targeting period. The average growth rates in the two periods were 1,6 per cent and 4,3 per cent respectively (measured as a percentage

Figure 6:    Headline and CPIX inflation

Percentage change over 12 months



Source: Statistics South Africa
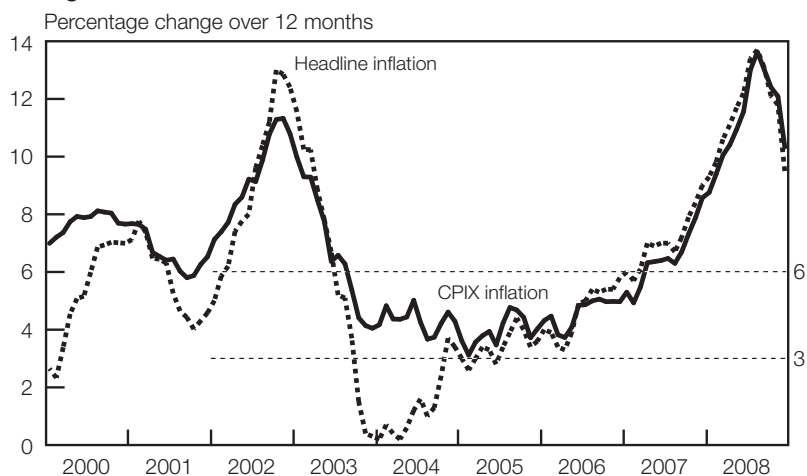
change on the same quarter in the previous year). This shows that inflation targeting has been consistent with (although not necessarily the cause of) higher average growth. In terms of variability, the standard deviation of inflation declined from 3,5 to 2,2, while the standard deviation of output growth declined from 2,3 to 1,1. In other words, not only has average inflation and inflation variability declined, but output growth variability has declined as well, while output growth has increased.
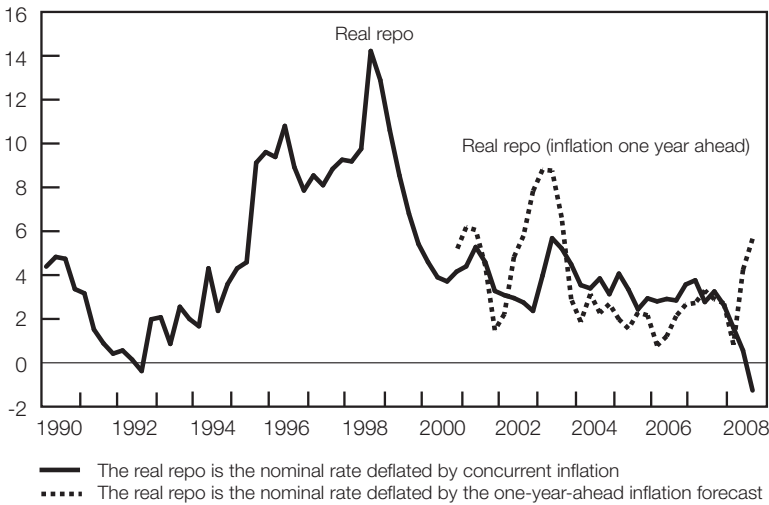
Table 2:    South African inflation and growth in the pre-targeting and targeting periods

| Inflation | Mean (per cent) | Standard deviation |
|---|---|---|
| Pre-targeting period ................................ | 9,7 | 3,5 |
| Targeting period ..................................... | 6,5 | 2,2 |
| Gross domestic product growth | | |
| Pre-targeting period ................................ | 1,6 | 2,3 |
| Targeting period ..................................... | 4,3 | 1,1 |
| Real policy rate | | |
| Pre-targeting period ................................ | 5,7 | 4,1 |
| Targeting period ..................................... | 3,3 | 1,3 |

Note: The pre-targeting period is 1991Q1–1999Q4
The targeting period is 2000Q1–2008Q2

Figure 7 shows that there has been greater stability in the real interest rate, measured as the official policy rate (bank rate and repo rate) deflated by the contemporaneous inflation rate. On this basis, the real policy rate averaged 5,7 per cent in the 1990s and 3,3 per cent in the inflation-targeting period. Of greater significance perhaps is the relative *stability* of the real rate in the inflation-targeting period, with the standard deviation falling from 4,1 in the 1990s to 1,3 in the 2000s.[8] Aron and Muellbauer (2007) also show that inflation targeting has not disadvantaged potential investment in terms of the level of tax-adjusted real interest rates. It is clear that monetary policy has not resulted in a tighter stance of monetary policy on average when measured in terms of real interest rate developments.

Figure 7:    Real repurchase (repo) rate



The real repo is the nominal rate deflated by concurrent inflation
The real repo is the nominal rate deflated by the one-year-ahead inflation forecast

As discussed in previous sections, the South African experience has illustrated the difficulties that are faced when dealing with exchange rate or supply-side shocks. Aron and Muellbauer (2007, 2009) argue that the monetary policy decisions taken in response to the sizeable domestic and external shocks have improved significantly during the inflation-targeting period.[9]

In response to these exchange rate and commodity price shocks, the MPC adopted a relatively flexible approach and did not attempt to get back to within the target over the shortest possible time horizon. In general, the MPC attempted to look through the short-term impacts of the shocks and to focus on the second-round effects. Some interest rate smoothing was applied as evidenced in the gradual changes that were applied during the interest rate cycles.

With respect to the cyclicality of monetary policy, du Plessis et al. (2008) made use of a structured vector autoregression (SVAR) approach, confirming monetary policy's mainly countercyclical stance since 1994, with some evidence of procyclicality from 2004 during the inflation-targeting period. However, no clear conclusion could be drawn with respect to the stabilising impact of monetary policy. In line with these results Frankel et al. (2007), who also made use of the SVAR methodology, found that monetary policy was mainly countercyclical, but somewhat procyclical in 2004 and 2005. While it appears that there may be some evidence of procyclicality in the period, the change in the monetary policy stance in 2006 would have reversed that somewhat.

Ortiz and Sturzenegger (2007) found that the monetary policy reaction rule of the Bank had been stable and in line with those estimated for Canada, the UK, New Zealand and Australia. Compared to emerging markets, the South African monetary policy has been more stable, with a more consistent anti-inflation bias, a somewhat larger weight on output and a very low weight on the exchange rate. The authors ascribed the latter to the low levels of foreign-currency liabilities and the well-developed capital markets in South Africa.

Although the recent debate in South Africa has focused on the impact of the inflation-targeting regime on output, there are other positive aspects of the system that have been identified. Monetary policy has also become more transparent. Aron and Muellbauer (2007), using an adjusted Geraats index, show the significant improvement in transparency after the implementation of inflation targeting. As they note, increased transparency reduces uncertainty, and raises the level of investment and quality of decision-making. However, they note that there is scope for further improvement. They also show that monetary policy has become more predictable. They show that the forward market anticipated repo rate changes well and has done so from the very beginning of explicit inflation targeting in 2000, and this remained true when controlling for recent macroeconomic volatility and the recent volatility of the repo rate (see also Ballim and Moolman, 2005). Furthermore, they show that credibility has increased, as evidenced in the behaviour of inflation expectations (see also Rigobon, 2007). At the same time, communication has been improved with the production of the Bank's publication the *Monetary Policy Review* in addition to the *Quarterly Bulletin*, and also the introduction of the Monetary Policy Forums that are held twice a year around South Africa.

## 10. Conclusion

The inflation-targeting framework has not led to excessively restrictive policies in advanced or emerging-market economies. This is due in part to the generally flexible implementation of the framework that has allowed for a variable time horizon for policy. While inflation targeters would want to be within their targets at all times, it was argued above that most

inflation-targeting monetary frameworks accept that this is not only unlikely, but not always desirable. The various central banks have different ways of dealing with deviations from their targets, but all generally recognise that some flexibility should be allowed. The target is an anchoring device, and central banks should take credible action to get back to within the target. But this does not have to be achieved in as short a timeframe as possible. However, there is always a difficult trade-off between such flexibility and building or maintaining credibility.

Most central banks are currently outside their target ranges, raising the question of whether inflation targeting has failed in the face of large supply-side shocks. Emerging markets have been exposed to these shocks more acutely, particularly given the higher weight of food in their consumption baskets. Walsh (2008: 30) suggests that breaches of the target are not necessarily a bad development: "It is these target misses that provide central banks with the best opportunity to explain to the public why inflation has temporarily moved higher and to show they have a consistent policy for ensuring a return to low inflation. Accountability is strengthened by this process."

In South Africa, despite the challenges posed by supply-side and exchange rate shocks, the variability of both output and real interest rates has declined during the inflation-targeting period. Fears that the implementation of inflation targeting has been inimical to growth in South Africa are therefore unfounded. The constitutional mandate of the Bank is the achievement of price stability. The contribution that monetary policy and price stability make to long-run growth is by reducing uncertainty and promoting a stable environment for growth. In the absence of an explicit target for inflation, as provided for in the inflation-targeting framework, monetary policy would still have remained focused on achieving price stability, responding to the self-same supply shocks that the economy has recently faced. The advantage of inflation targeting is that it provides an explicit anchor for managing inflation expectations: if successful, this significantly reduces the costs of bringing inflation down.

## Notes

[1] This raises the question as to what level of inflation is acceptable. Some argue that below certain levels there are no benefits to bringing inflation down further and therefore the costs of disinflation exceed the benefits. (See, e.g. Khan and Senhadji, 2001).

[2] It may, of course, be argued that this had a lot to do with a reversal of the depreciation. But against this it could be argued that failure by the MPC to react could have caused inflation expectations to become totally unanchored, and the higher inflation expectations could, in fact, have led to further depreciation and further inflation pressures.

[3] The petrol price is part of the administered price index.

[4] Real interest rates, where the nominal interest rate is deflated by expected inflation, would remain relatively unchanged if there was a general expectation of a temporary spike.

[5] In the South African Reserve Bank's forecasting model assumptions have to be made regarding the international oil price for the forecast period of three years. The oil price assumption is made after analysing the conditions in the oil market, the forecasts of about 16 international analysts and futures prices.

[6] See van der Merwe (2004) for a discussion of the early implementation of inflation targeting in South Africa.

[7] The target will be changed to headline CPI from 2009 as Statistics South Africa will move to a rental equivalence measure for housing and no longer use mortgage interest costs.

[8] An alternative measure is also shown in Figure 7, where the real repo rate has been deflated by the ten-year-ahead inflation forecast of the Bank since 2000. This shows a different picture for the most recent period, given the expectation that consumer inflation had peaked in the third quarter of 2008.

[9] See Aron and Muellbauer (2009) for a discussion of the 1998 and the 2001 exchange rate shocks and the differences in the response.

## Acknowledgement

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