

# FISCAL AND MONETARY POLICY IN A COMMODITY-BASED ECONOMY

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## Abstract

A rough description of the policy assignment in South Africa would have monetary policy focused on building up nominal credibility through focusing on inflation, with the brunt of the responsibility for output stabilization on the treasury. This paper discusses the convenience of such a policy mix. First, we estimate the business cycle impact of fiscal and monetary policy to find that so far fiscal policy has been mostly procyclical, whereas monetary policy has been, over the last couple of years, mildly countercyclical. We argue that fiscal policy should be made significantly more countercyclical than it has been, a strategy that would deliver more macroeconomic stability and potentially higher growth. Furthermore, we believe the Central Bank has earned the credibility to operate macro policy with a more decisive output stabilization objective, and we discuss several reinterpretations of the inflation targeting regime that provide the flexibility to do so without risking the strong anti-inflationary credibility of the SARB. On exchange rate policy we recommend that the authorities take a pragmatic approach to floating, mostly allowing the currency to move freely, but intervening to avoid overvaluation. We explain why and discuss how this objective could be achieved.

*First version: July 2006*

*This version: January 2008*

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<sup>1</sup> The authors would like to thank Philippe Aghion for his contribution to Part III and to Federico Dorso, Pablo Gluzmann and M. Melesse Tashu for very capable research assistance. Ricardo Hausmann helped with significant input and Lawrence Harris provided a wonderful discussion in the July meetings with Treasury in Pretoria. Stan du Plessis provided careful and comprehensive comments of an earlier draft. This report has also nurtured from extensive discussion with all the team engaged in the project as well as with talk with government officials and South African academics, particularly at a seminar held at the University of Stellenbosch in late January 2007. We particularly thank Johannes Fedderke, Brian Kahn, Ismael Momoniat, and Theo van Rensburg, for sharing ideas and suggestions for this report. Alan Hirsch also provided guidance as to the main issues that should be covered. Trevor Manuel enlightened us with a careful description of the issues in our several trips to South Africa.

## 1. Inflation targeting and stabilization

Although simple characterizations never do true honor to the subtleties of macroeconomic policy, a rough description of policy assignment in South Africa would have monetary policy focused on building up nominal credibility through focusing on inflation, with the brunt of the responsibility for output stabilization on the treasury. While we are aware that the monetary authorities are not solely centered on inflation (witness the accumulation of foreign reserves over recent years), it is enlightening to transcribe a paragraph from the June 8, 2006 meeting of the Monetary Policy Committee:

*“The international environment has posed increased risks to the inflation outlook. Since the previous meeting of the MPC the exchange rate of the rand has come under pressure as a result of developments in international financial and commodity markets. Previously the relative exchange rate stability had contributed to the positive inflation outlook. In the past weeks, the rand has depreciated against all the major currencies at a time when the US dollar has been weakening against other major currencies. The decline in commodity prices and the re-rating of emerging market risk contributed to the depreciation of the rand from around R6,12 to the US dollar at the time of the previous MPC meeting to current levels of around R6,80, and from R7,42 to the euro to current levels of around R8,65. On a trade-weighted basis, the rand has depreciated by approximately 13 per cent since the previous MPC meeting.”*

This, among other factors, led to the conclusion

*“On the basis of the detailed analysis of the economy which is summarized above, the MPC has decided that a moderate adjustment in the repo rate is warranted at present. Accordingly the repo rate is increased by 50 basis points to 7.5 per cent per annum with immediate effect. The MPC will continue to monitor economic developments and all the relevant risks which might have a bearing on the continued attainment of the inflation target.”*

These paragraphs are revealing in that the report focuses on the inflation impact of the reversal in capital flows and rand depreciation. In this specific case we observe a monetary policy that becomes contractionary exactly when capital is pulling out.

This happens to be a well known problem with inflation targeting. We illustrate it with the simplest specification possible. Imagine a world with supply ( $s$ ) and demand ( $d$ ) shocks. We can write an output equation that depends on both demand and supply shocks ( $d$  and  $s$ ) and monetary policy ( $m$ ) as:

$$y = d + s + \beta m ,$$

and an inflation equation which also depends on the same three shocks:

$$\pi = m - \omega s + \nu d .$$

This setup reveals a dilemma faced by a Central Bank focused on inflation targeting: even though demand shocks move inflation and output in the same direction, so that stabilizing one leads to a stabilization of the other, supply shocks move output and inflation in opposite directions, so that the objective of stabilizing inflation is contradictory with that of stabilizing output. What alternatives does the Reserve Bank face when thinking about stabilizing output and inflation?. Consider three alternative cases: a policy of strict inflation targeting, a policy of monetary targets and a policy of output stabilization. We can illustrate the inflation targeting regime by assuming the Reserve Bank chooses  $m$  to keep inflation equal to zero, i.e. its objective function is solely focused on inflation. If so, from the inflation equation above:

$$m = \omega s - v d .$$

This implies in the output equation that:

$$y = d(1 - \beta v) + s(1 + \beta \omega),$$

which gives

$$\sigma_{\pi}^2 = 0, \quad \text{and} \quad \sigma_y^2 = \sigma_d^2(1 - \beta v)^2 + \sigma_s^2(1 + \beta \omega)^2 .$$

Alternatively a monetary rule would imply:

$$m = 0 ,$$

which would lead to different volatilities of inflation and output:

$$\sigma_{\pi}^2 = w^2 \sigma_s^2 + v^2 \sigma_d^2, \quad \text{and} \quad \sigma_y^2 = \sigma_d^2 + \sigma_s^2 .$$

Finally, a regime where monetary authorities minimize the volatility of output leads to the monetary rule:

$$m = -\frac{1}{\beta}(d + s),$$

which implies

$$\sigma_{\pi}^2 = \left(\frac{1}{\beta} + w\right)^2 \sigma_s^2 + \left(v - \frac{1}{\beta}\right)^2 \sigma_d^2, \quad \text{and} \quad \sigma_y^2 = 0 .$$

In short we conclude that there is a tradeoff between inflation volatility and output volatility. For example, if only supply shocks are present (something that our structural VAR decomposition suggests may not be too far from reality), then inflation targeting delivers an output volatility of  $\sigma_y^2 = \sigma_s^2(1 + \beta \omega)^2$  which is definitely larger than the zero volatility attained under an output stabilization rule but even larger than that obtained under a simple monetary rule  $\sigma_y^2 = \sigma_s^2$ . The drawback is of course the volatility of inflation, which is zero in the first case, is given by  $\sigma_{\pi}^2 = \left(\frac{1}{\beta} + w\right)^2 \sigma_s^2$  in the case of output stabilization and is given by  $\sigma_{\pi}^2 = w^2 \sigma_s^2$  with a money rule.

Note that the tradeoff refers to the volatility, and not the level of the inflation rate. Under the assumption that the shocks have mean zero (which is virtually a definition of “shocks”), expected inflation is equal to zero in all cases. Thus the volatility of output critically depends on how much volatility in the inflation rate the Reserve Bank is willing to tolerate, not whether it has to acquiesce to a higher level of inflation.

## 2. The fiscal and monetary policy mix in South Africa

The above framework provides a bare bones model to discuss relation between fiscal and monetary policy. This issue has not gone unnoticed. In fact, the cyclical properties of monetary and fiscal policy in South Africa have received substantial attention in the literature.<sup>2</sup> Swanepoel (2004) finds monetary policy has been mostly anti-cyclical, but not always effectively coordinated with fiscal policy. Du Plessis (2006) finds monetary policy more anti-cyclical since the early 1990s, while fiscal policy has been only modestly countercyclical. (This latter result is in itself significant as it would show that fiscal policy has escaped the general tendency for procyclicality common in emerging economies.) Du Plessis and Smith (2003) analyze real interest rates through different phases of the business cycle and find that monetary policy has been mostly procyclical, though much less as of late; in fact they estimate that more systematic monetary policy has been responsible for about 55% of the improved stability of the SA economy since 1994 (compared with 1985-1993). On the fiscal side, structural budget deficits look pro-cyclical since 1980s due to pro-cyclical expenditure (e.g. Swanepoel and Schoeman, 2003).

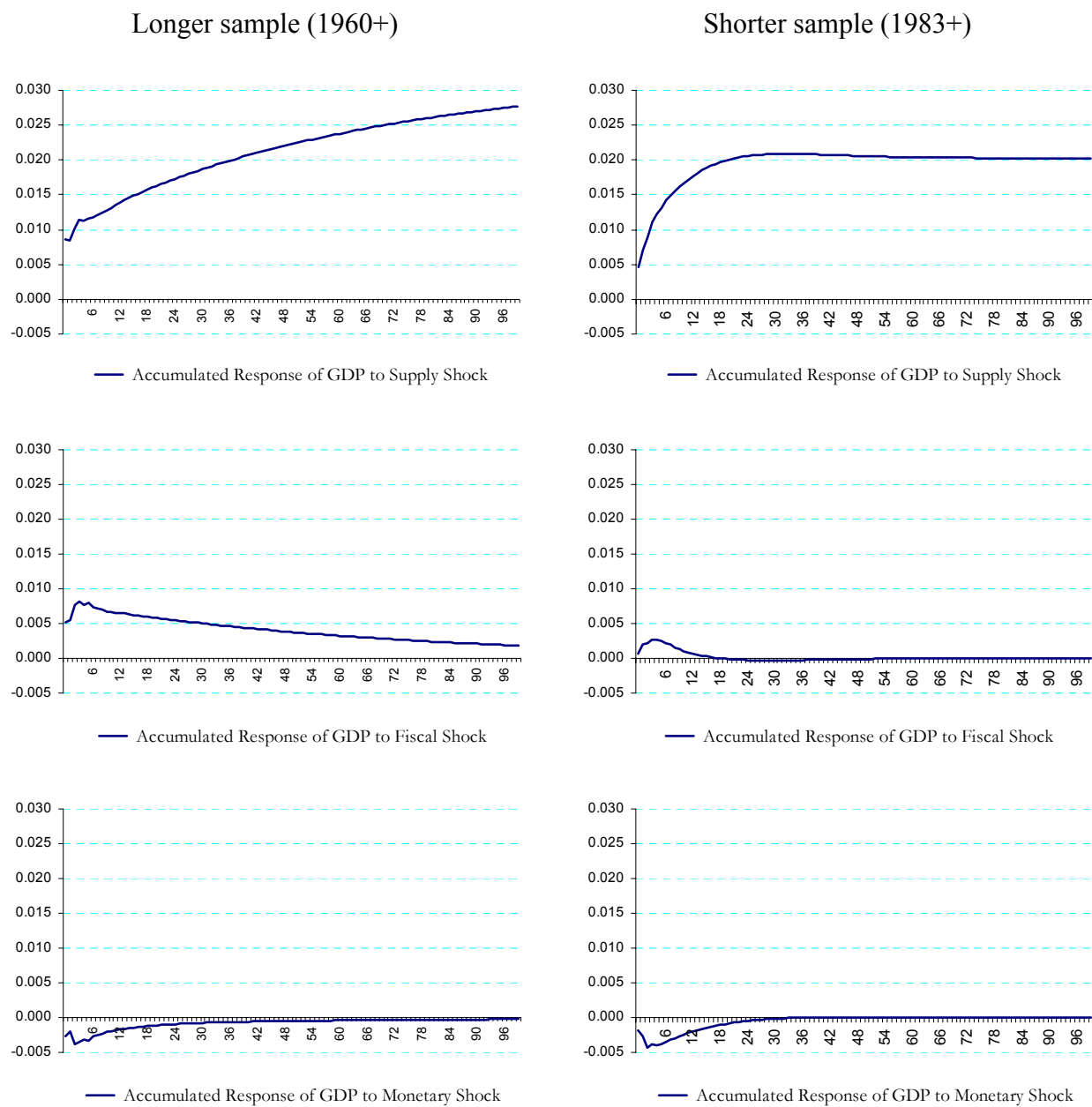
Du Plessis, Smit and Sturzenegger (2007, forthcoming) use a structural VAR to discuss potential output and business cycles and to unveil the cyclicity of monetary and fiscal shocks as well as the relation among them. Figure 1 shows how the three variables respond to supply, fiscal and monetary shocks for two samples, one starting in 1960 and one starting in 1983. On output the results are very intuitive. Supply shocks have a time lag until they build up to their full effect. Fiscal shocks have a hump-shaped form. It takes about a year before fiscal shocks reach their maximum effect, which then dies out only after some five years. Monetary shocks, on the other hand have a negative effect (a monetary policy shock is an increase in the real interest rate)<sup>3</sup>.

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<sup>2</sup> See among others Du Plessis and Smit (2003), Du Plessis (2005), Swanepoel and Schoeman (2003), and Swanepoel (2004).

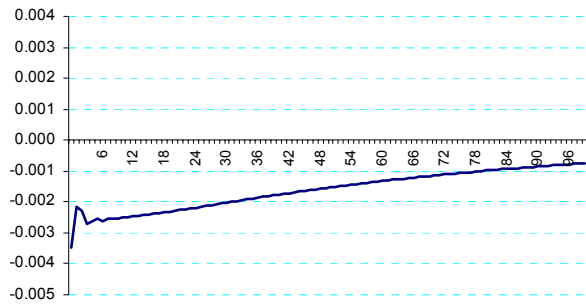
<sup>3</sup> Monetary policy becomes more important with the shorter sample that avoids the higher inflation period of the 1970s.

Figure 1 Impulse responses on GDP to the three shocks



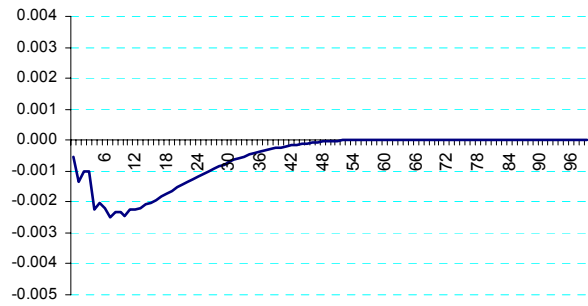
Impulse response of fiscal policy to the three shocks

Longer sample (1960+)

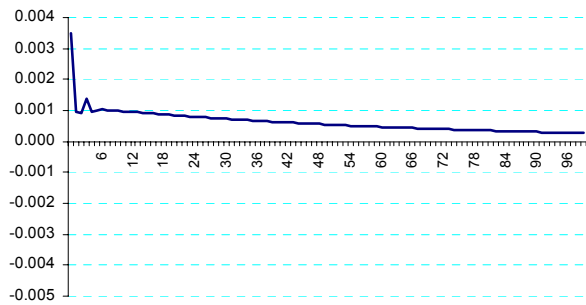


— Response of Gov. Cons as percentage of GDP to Supply Shock

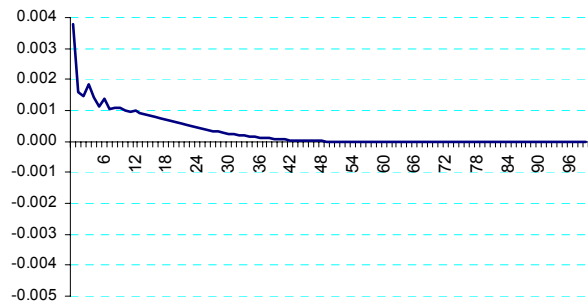
Shorter sample (1983+)



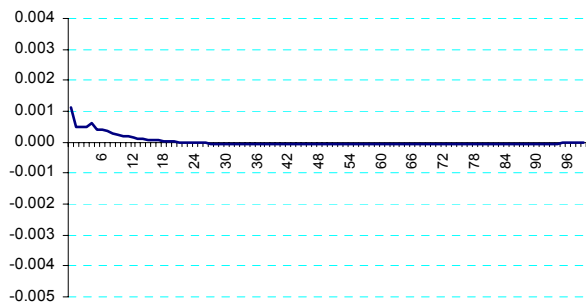
— Response of Gov. Cons as percentage of GDP to Supply Shock



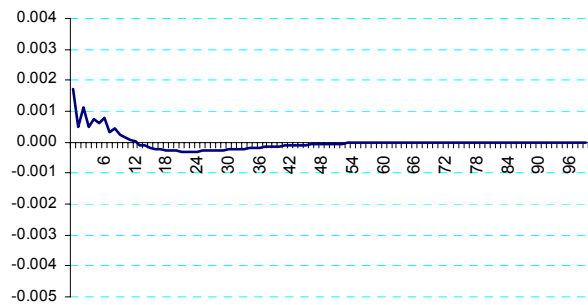
— Response of Gov. Cons as percentage of GDP to Fiscal Shock



— Response of Gov. Cons as percentage of GDP to Fiscal Shock



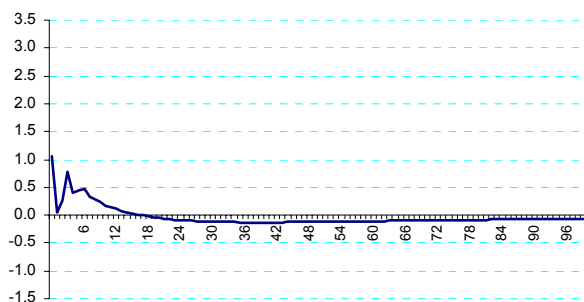
— Response of Gov. Cons as percentage of GDP to Monetary Shock



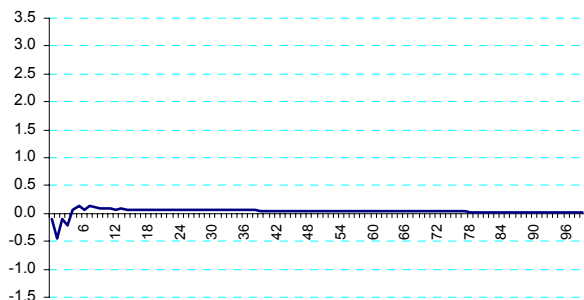
— Response of Gov. Cons as percentage of GDP to Monetary Shock

Impulse response of monetary policy to the three shocks

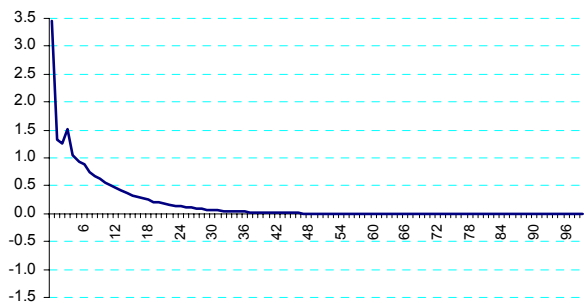
Longer sample (1960+)



— Response of Real Interest Rate to Supply Shock

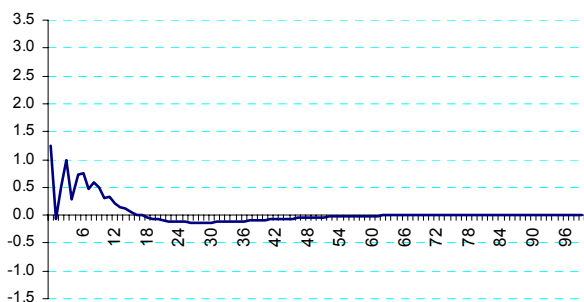


— Response of Real Interest Rate to Fiscal Shock

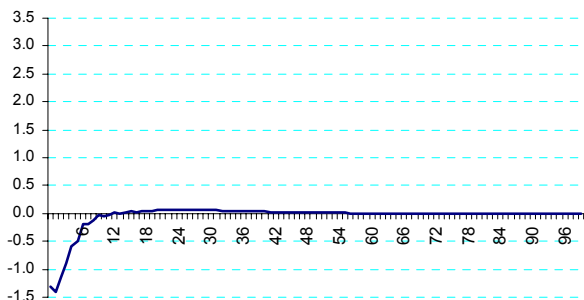


— Response of Real Interest Rate to Monetary Shock

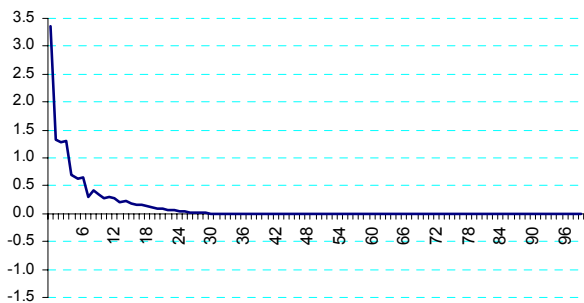
Shorter sample (1983+)



— Response of Real Interest Rate to Supply Shock



— Response of Real Interest Rate to Fiscal Shock



— Response of Real Interest Rate to Monetary Shock

Source: Du Plessis, Smit and Sturzenegger (2007).

The response of the other variables is also interesting in its own right because they allow us to understand how fiscal and monetary policy react to each other as well as to supply shocks. Starting with fiscal policy, they show that the response seems to drop, with a supply shock eventually converging to zero. This indicates that when there are positive supply shocks government consumption initially lags this development (thus the ratio of government consumption to GDP falls), but eventually recovers ground. The fact that the effect converges to zero indicates that eventually government consumption increases by as much as GDP. On the other hand fiscal policy appears to respond so as to counteract the effects of monetary policy. A positive monetary shock (an increase in real interest rates) triggers a fiscal expansion, thus

providing some evidence that to the extent that monetary policy does a poorer job of stabilizing the economy, this imposes a higher burden on fiscal policy.

The response of monetary policy to supply shocks appears to be countercyclical, dispelling somewhat the view that monetary policy may have been overly procyclical in response to supply shocks. On the other hand, monetary policy appears to accompany fiscal policy expanding when there are independent fiscal shocks.

From the model, Du Plessis, Smit and Sturzenegger (2007) compute the contribution of each shock to GDP and then estimate the relation between the two actual shocks. Their results are shown in Tables 1 and Figures 2, where they compute the correlation between monetary and fiscal shocks with GDP (they use the post 1983 sample). The results show that during the period 1994/2006 monetary policy has been far less procyclical than fiscal policy. However the opposite holds for the period 1994/2002, so it is after 2002 that monetary policy contributes to output stabilization in such a forceful way, at a time when fiscal policy became strongly procyclical. Yet since 2004 monetary policy appears to have reverted to a procyclical pattern. Thus, even though overall the pattern of monetary policy appears to be fairly countercyclical, this stems mostly from the 2002/2004 period, with monetary policy stimulating the cycle in the other years.

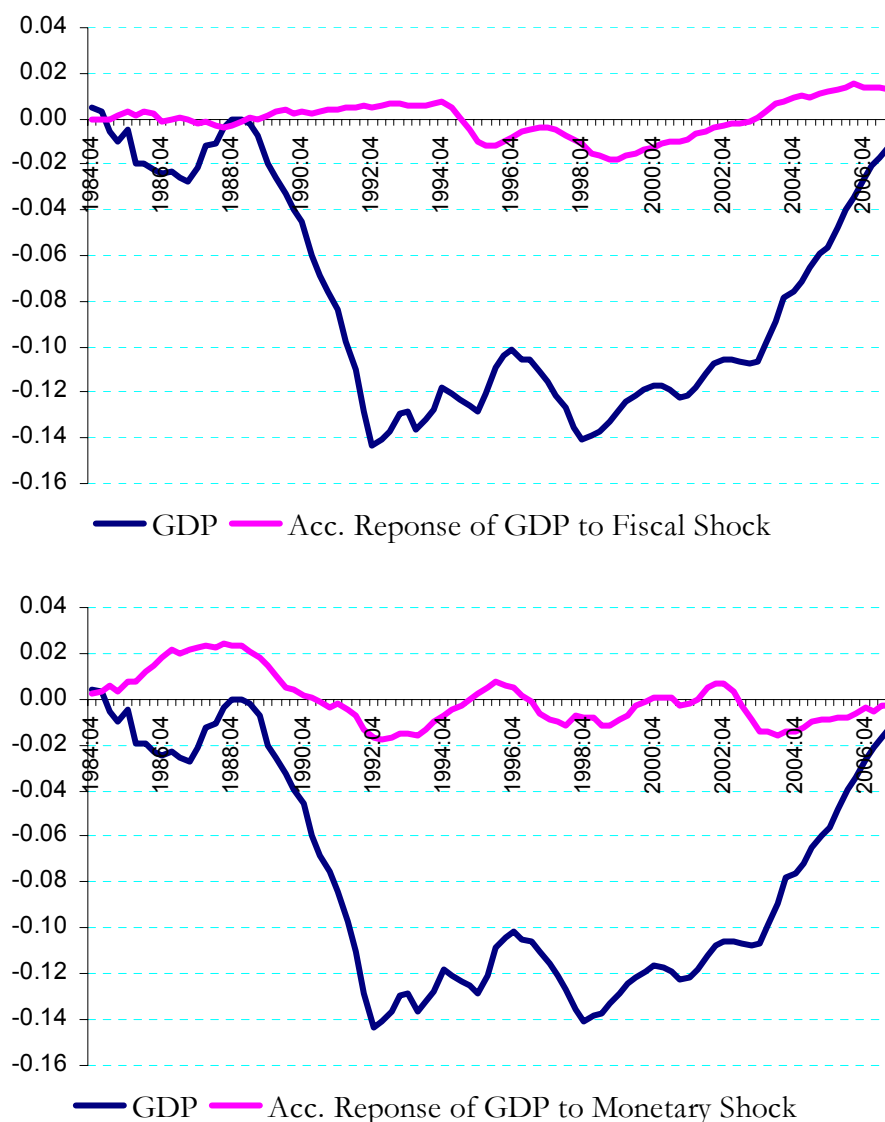
*Table 1. Procyclicality of Fiscal and Monetary Policy*

Period	Correlation between Acc. Shocks & GDP	
	Fiscal Shock	Monetary Shock
1983Q4 - 2007Q3	0.1934	-0.3600
1983Q4 - 1994Q1	0.8175	0.1648
1994Q1 - 2007Q3	0.5643	-0.1014
1994Q1 - 2002Q1	-0.8051	-0.4794
2002Q1 - 2007Q3	0.9874	0.3532
2002Q1 - 2004Q4	0.9829	-0.6087
2004Q4 - 2007Q3	0.9901	0.9409

Source: Du Plessis, Smit and Sturzenegger (2007).



Figure 2. Procyclicality of Fiscal and Monetary



Source: Du Plessis, Smit and Sturzenegger (2007).

### 3. Thinking about the procyclicality of fiscal policy<sup>4</sup>

It is well-known that fiscal policy is procyclical in most developing countries. Why is this so? Among the reasons are:

- Political business cycle, especially in new democracies<sup>5</sup>
- Procyclical capital flows, in emerging markets<sup>6</sup>
- Need for fiscal contraction in debtors hit by sudden stops.<sup>7</sup>
- Dutch Disease, in commodity-producers

<sup>4</sup> We thank Philippe Aghion for sharing this material with us.

<sup>5</sup> Brender and Drazen (2005).

<sup>6</sup> Kaminski, Reinhart, and Vegh (2004).

<sup>7</sup> Gavin *et al* (1996).

Brender and Drazen (2005) analyze the political budget cycle, and suggest that

*“the finding of a political fiscal cycle is driven by the experience of “new democracies”, where fiscal manipulation may “work” because of lack of experience with electoral politics or lack of information that voters in more established democracies use. The strong fiscal cycle in those countries accounts for the finding of a fiscal cycle in larger samples that include these countries. Once these countries are removed from the larger sample, the political fiscal cycle disappears.”*

Talvi and Vegh (2000) argue that fiscal policies are procyclical because weak governments cannot resist the political pressures to increase spending when in a boom, i.e., when tax collection is on the rise, particularly when the economy benefits from an improvement in its terms of trade. Therefore, governments increase expenditures and reduce taxation, which delivers the result that both tax and expenditure policies become procyclical. The strong increase in fiscal demands during expansions can be rationalized by the so called “voracity effect” proposed by Lane and Tornell (1998). According to their interpretation, if a group does not increase its appropriation during a boom, other groups will. Lane and Tornell show that there is a strong incentive to grab part of the newly available resources before other groups do, and that the incentives to do so increase with the size of the pie. Thus, this common pool problem becomes stronger in an expansion, delivering the procyclical result.

Gavin *et al* (1996) suggest that the procyclicality arises from limited access to capital markets during downturns, thus forcing the government to contract expenditures when it needs them most. This interpretation finds some support in that spending appears to be much more procyclical during recessions than during booms.

One variant of this source of procyclical fiscal policy is the Dutch Disease. In commodity booms governments increase spending – e.g., on government employment -- in response to the greater availability of finance through both tax revenue and borrowing. Then they find it hard to cut back when commodity prices go back down.

More recent work by Aghion *et al* (2006a, 2006b) has studied the link between fiscal policy procyclicality and growth. Suppose, for example, that the borrowing capacity for domestic firms is constrained, at least for a subset of them. In this case, firms will be unduly constrained during a recession, and there may be a role for macro-policies. In fact, a countercyclical budgetary policy may mute the negative consequences of a recession (or of a bad aggregate shock), for example, on firms’ innovative investments. It follows that the lower the level of financial development (the tighter the credit constraints), the more growth-enhancing such countercyclical policies should be.

To the extent that at least some South African firms are credit-constrained, we have a case for countercyclical budgetary policies. The government may increase the volume of public investments, thereby fostering the demand for private firms’ products during recessions and allowing them to avoid the credit constraint by propping up their cash flow, and avoiding sacrifices to R&D or other productivity enhancing investments.

Following Aghion *et al* (2006a, 2006b), we measure the procyclicality of fiscal policy by computing a rolling regression that relates the reaction of fiscal policy to output shocks.<sup>8</sup> Figure 3 shows a measure of the rolling coefficients throughout recent South African history for public

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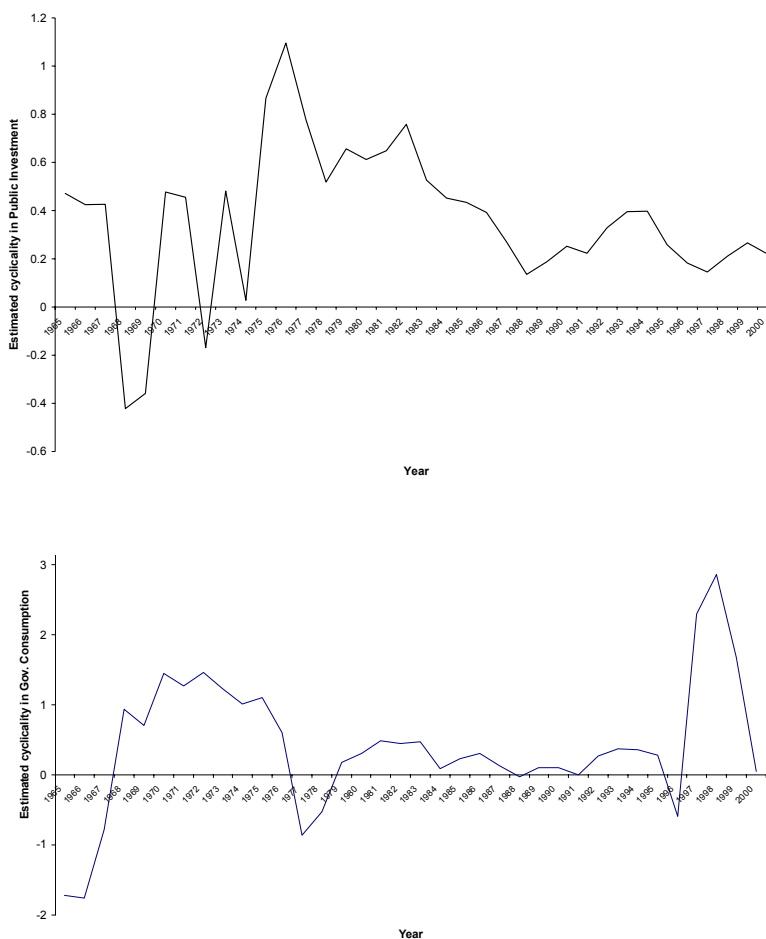
<sup>8</sup> The rolling regression includes a ten year window centered at each moment in time.

investment, public consumption and government debt. Consistent with our numbers above, fiscal policy seems to follow a procyclical pattern.

We then estimate the relation between procyclicality and growth. The results are summarized in Table 2, which shows that eliminating public investment procyclicality would increase growth by 0.36% per year. Similar results obtain when analyzing government consumption or debt. Thus, our main policy recommendation on this issue would be the need of a countercyclical fiscal policy.<sup>9</sup>

Our preferred way of obtaining such countercyclical fiscal policy is to fix the level of public expenditure on the basis of long run objectives in terms of public goods (spending policy is in any case relatively inefficient for short run macro stabilization) while allowing for public resources to move with the cycle. Tax revenues would continue automatically to rise in booms and fall in recessions. The results suggest that this automatic countercyclical mechanism in the budget is likely to deliver better growth performance. This fiscal policy is more countercyclical than just keeping the fiscal deficit small and low as has been the stated policy of Pretoria in recent years.

Figure 3. Rolling regressions on procyclicality



<sup>9</sup> Although we would expect the growth effect to decrease with the level of financial development, we find the opposite result for investment and debt for South Africa which may be related to the high degree of financial development. In any case, the overall result provides the relevant estimator.

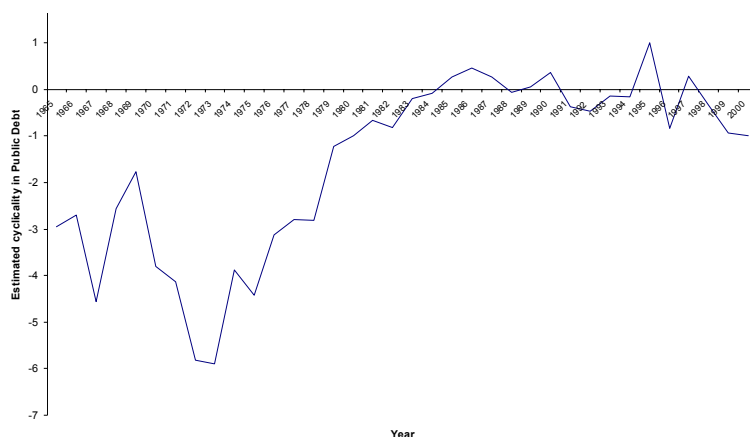


Table 2 The effects of procyclicality on growth

	Estimated effect of Procyclicality	*	Average lagged Procyclicality	+	Interaction with Financial Development	*	Average lagged Procyclicality	*	Average lagged Private credit/GDP	=	implied effect on growth
Government Investment	0.0402	*	-0.3618	+	-0.0977	*	-0.3618	*	0.5143	=	0.0036
Government Consumption	-0.0385	*	-0.4014	+	0.0651	*	-0.4014	*	0.5143	=	0.0020
Government Debt	0.0914	*	1.5781	+	-0.1747	*	1.5781	*	0.5143	=	0.0024

#### 4. Options for managing fiscal policy

##### a. The design of fiscal policy in a commodity-exporting country

As noted, one of the standard Dutch Disease problems is excessive growth in spending by the government which is hard to reverse when the cycle goes back down, either because the economy slows down or some income tax commodity based revenues fall. A question for South Africa today is: if the forces in favor of “spending the surplus” are politically powerful, can institutions be phrased so as to minimize such undesirable Dutch Disease dangers? One possibility is to aim for a fiscal policy that targets a cyclically adjusted budget outcome. What this budget outcome should be depends on how the government sees its intertemporal budget constraint. Chile for example, aims at a budget surplus (originally 1% of GDP, but reduced from May 2007 to ½% of GDP) to compensate for the fact that it is depleting its stock of mineral resources.

One way to do this is to define fiscal policy objectives on the basis of a “structural fiscal balance” rather than on the basis of the actual fiscal result. The structural fiscal balance (SFB) is defined as the budget that would have prevailed if the real economy had been at its long run trajectory. The calculation requires netting out the effect of transitory and cyclical components.

The SFB is defined as: 
$$SFB_t = FB_t - RT_t + \left[ RT_t \times \frac{Y_t^*}{Y_t} \right]^\epsilon - ST_t + SST_t$$

where SFB is the structural fiscal balance, FB is the actual fiscal balance, RT is regular taxes,  $Y^*$  is potential or trend output, Y is real output, ST are special taxes, and SST are structural special taxes. The symbol  $\epsilon$  stands for the elasticity of tax revenues with respect to income (for every 1% growth in real income, tax revenue goes up  $\epsilon$  percent).

We distinguish regular taxes from special taxes which may warrant an independent treatment (such as revenues from copper production in Chile), and for which the structural level of taxes cannot simply be computed by an adjustment from trend GDP.

From an operational point of view the level of expenditure for a given year is determined as follows:

1. The government starts with a level of expected income (this includes the best available forecast of income resulting from the economic situation, changes in taxes, etc.). Income from capital changes is excluded.
2. An estimate is undertaken on the cyclical components of tax collection. This has two parts, an estimate of how much output deviates from trend GDP and an estimate of the permanent component of special (mostly commodity related) taxes. These cyclical components can be estimated by statistical procedures or by appointing independent committees (as Chile does).
3. Using the sustainable level of special taxes and correcting for cyclical level of output, a new resource level is estimated. This would correspond to the level of resources if GDP were at its trend and special taxes were at their permanent level.
4. Having estimated structural income, the level of expenditure is determined to achieve the structural balance objective, which we suggest should be a balanced structural budget.<sup>10</sup>

### *Caveats*

Methodologies for estimating the structural balance differ.<sup>11</sup> Two standard differences are that some apply output elasticities not only to revenues (as above) but also to expenditures; this would reduce the countercyclicality of the resulting fiscal policy rule. Alternatively some authors exclude capital expenditures. This is a key issue in South Africa, which faces a large increase in investment. We recommend including them, to ensure more substantial countercyclicality. Note that given the current boom, it is likely that application of the rule will lead to an increase in the surplus relative to current levels. If increased spending is deemed truly necessary, for example on infrastructure or social goals, then the government must be prepared to raise taxes to pay for it.

Although of limited importance for South Africa, where the government does not own the mineral resources directly, one could also think of mechanisms such as a “Mineral Revenue Stabilization fund.” It is true that in the case of South Africa, the treasury does not collect revenues from the

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<sup>10</sup> In commodity-producing countries prone to the Dutch Disease, it is desirable to subject fiscal policy to a rule that takes into account not only temporary increases in output above potential, but also temporary increases in commodity prices above their long-run average. In both cases, the goal is to avoid mistaking temporary booms for permanent riches and thereby over-expanding spending. Chile’s fiscal policy is guided by two panels of experts: one to compute the extent to which output lies above or below potential, and another to compute the extent to which the price of copper (which is half of exports) lies above or below its long run level.

<sup>11</sup> See Marcel et al (2001), Hagemann (1999) or Giorno et al (1995).

mining sector as directly as in Chile or Norway, but this does not preclude that large swings in commodity prices affect the income tax collected from the sector. A panel of independent experts could be established to estimate how much of tax revenue is due to a temporary commodity price boom, after which that amount is to be put aside rather than spent. To enhance the acceptability of the idea from a political economy viewpoint, the money could go into an account earmarked for retirement funds or to run down debt. Also it may be possible to use the argument that non-renewable resources are being run down.

## **b. Debt management for reduced vulnerability**

Without passing judgment on the probability or severity of any future financial turmoil internationally, it is useful in any country to think of ways that policy makers might be able to reduce the probability and severity for them of such crises. We begin with a more technical question: for a given overall magnitude of capital inflow, can ways be found through debt management to reduce the probability and severity of possible crises?

### **i. The composition of inflows and better risk-sharing**

Even taking the total of capital inflows as given, the composition can make a big difference. The different dimensions of composition have in common that the more desirable arrangements are those that efficiently allow the country to share risks with foreign investors -- those that automatically divide the losses of bad times and the gains of good times in some reasonable proportion between the two sides.<sup>12</sup> In the case of short-term dollar-denominated loans, “bad times” implies an inability to service the debt on the terms originally agreed to. However, both of the traditional responses by the monetary authorities to sudden stops – devaluation and monetary contraction – have adverse balance sheet effects, and typically there follows a difficult, lengthy and expensive period of negotiation with creditors. The restructuring is likely to be difficult and lengthy in part because it may be necessary to try to round up thousands of small creditors (especially in the case of bondholders), many of whom will wish to “free ride” on the concessions of the others. It is likely to be expensive in part because of the time demands on bankers and government officials when they should be devoting attention to the real economy, and in larger part because an existing debt overhang is likely to discourage companies from undertaking new projects out of fear that any foreign exchange profits will be taken away from them to service the old debt. The intent of Collective Action Clauses is to ease the negotiations by reducing the free rider problem, but even if this eases somewhat the pain of the adjustment it is clear that this is not a mechanism to be relied upon exclusively.

A more complete answer to the problem is to finance a higher fraction of the inflow in the form of rand-denominated debt, equity, and foreign direct investment in the first place. Then in the event of bad times, such as a collapse in the world market for the country’s exports, the value of the assets falls automatically, with no negotiation needed. In the case of the rand-denominated debt, the value automatically declines when the rand declines on the foreign exchange market. In the case of equity and FDI, the value of the assets automatically declines for a second reason as well: the decline in the share value of the company even expressed in rand.

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<sup>12</sup> In theory, in well-functioning international financial markets, idiosyncratic country risk should be borne entirely by global investors. The reality seldom works that way, however, and in any case much of the risk we are talking about is not idiosyncratic but global.

South Africa has long been fortunate to be able to borrow in rand, in part because its financial markets are generally well-developed, and fortunate to experience large FDI inflows, in part because of attractive opportunities in the natural resource sector. Still, further movement in these directions is both possible and desirable.

## ii. A proposal to link bonds to mineral commodity prices

Financial markets have come up with hundreds of innovative derivative contracts and other financial products with the presumed goal of helping managing risk. A great puzzle for macroeconomists who think about the problems of mineral-exporting countries is why the existing list of successful financial instruments does not include commodity-linked bonds.<sup>13</sup> In theory, linking the value of bonds to the price of gold or platinum or a basket of minerals could constitute an additional valuable instrument to the risk-sharing problem for a mineral exporter such as South Africa<sup>14</sup>. When the dollar prices of those commodities decline on world markets, the dollar price of the liabilities would automatically decline in proportion. The arrangement is better than linking bonds to GDP, another academic proposal that has seemingly attracted more support, because the price of minerals can be measured more precisely and is not subject to subsequent revision as is GDP, nor to any moral hazard risk. It is even better than equities and FDI in that not all developing countries have sufficiently high transparency of accounting, integrity of management, and security of property rights to give foreign investors complete confidence. Particularly among petroleum exporters like Russia, the accounting and corporate governance is sometimes even worse than Enron's.

Mexico is one country that has experimented with hedging its oil exports by selling oil futures.<sup>15</sup> In theory this should be the same as shifting the composition of borrowing from dollars to oil. (Or, if borrowing was previously in the domestic currency, then selling oil futures should be the same as shifting to oil-denomination plus also buying peso futures.) In practice, there seems to be a subtle but critical difference between the futures strategy and the strategy of issuing mineral-linked bonds. The difference has to do with the career of the minister or vice-minister of finance, and the principal agent problem. Assume the price of oil goes up. The rest of the country comes to him expectantly, dreaming about how to use the windfall gain in wealth. If the minister has previously sold oil futures, and has to tell them there is no gain to spend, his career prospects are in jeopardy. The disappointment sharpens when the news enters the public domain: "Oil Minister Gambles Away National Patrimony on the Futures Market." Now assume instead that the price of oil goes down. The finance minister who has hedged on the oil futures market may just have saved his country from disaster, but nobody notices. Denominating bonds in the price of the export commodity largely avoids this career risk problem.

Economists in countries like Chile have discussed this option (denominating loans in copper, in their case). But it has never caught on. The usual answer is that Wall Street investors have not

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<sup>13</sup> Commodity-linked bonds have been proposed many times. The earliest modern-day reference known to the authors is Lessard and Williamson (1985).

<sup>14</sup> Again, this proposal is more relevant for a Chile or Zambia than for South Africa given that the latter faces less material risk of fiscal strain from a decline in the international price of any (or even all) of its major export commodities, that gold and platinum, though the two largest exports, are comparatively small shares of the total economy. A mineral linked bond would make the most sense for an economy where (i) the ability of the government to service its debt was closely tied to commodity revenues and (ii) the government faced liquidity constraints which prevented it from smoothing over rough times. Neither of these conditions holds for South Africa.

<sup>15</sup> It has also recently created insurance protection in the form of issuing debt in which the capital is not payable if a large hurricane hits the economy.

shown interest. This is surprising. Bonds denominated in copper or gold or oil have a natural buy-side constituency – companies that need to buy copper or gold or oil as inputs into production, for whom these bonds are a natural hedge. It seems likely that the problem is that because financial markets require liquidity, a new one will not be successful unless there is an initial push that gets it past a certain size threshold. Perhaps it is time to try to start a market in platinum bonds (or restart a market in gold bonds, which do have a long history). It might take a major effort – e.g., a refusal to borrow on other terms and/or coordination among a number of borrowing countries and creditor institutions -- to overcome the liquidity threshold effect and the apparent traditional reluctance of foreign investors. But a time when both mineral commodities and emerging markets are “hot” is probably a good time to inaugurate such an instrument.

## 5. Capital inflows and the exchange rate regimes

The consequences for South African capital flows of the 2006-2008 jitteriness in global capital markets may turn out to be either transitory or longer-lasting. Regardless, it remains important to consider questions regarding the implementation of monetary policy when an economy faces significant capital inflows and how this relates to the longer-run choice of exchange rate regimes.

Almost as a matter of definition, a country experiencing a balance of payments surplus or an increase in demand for its assets has a basic choice among (i) allowing the currency to appreciate, (ii) intervening to keep the value of the currency down, low or (iii) some combination of the two.

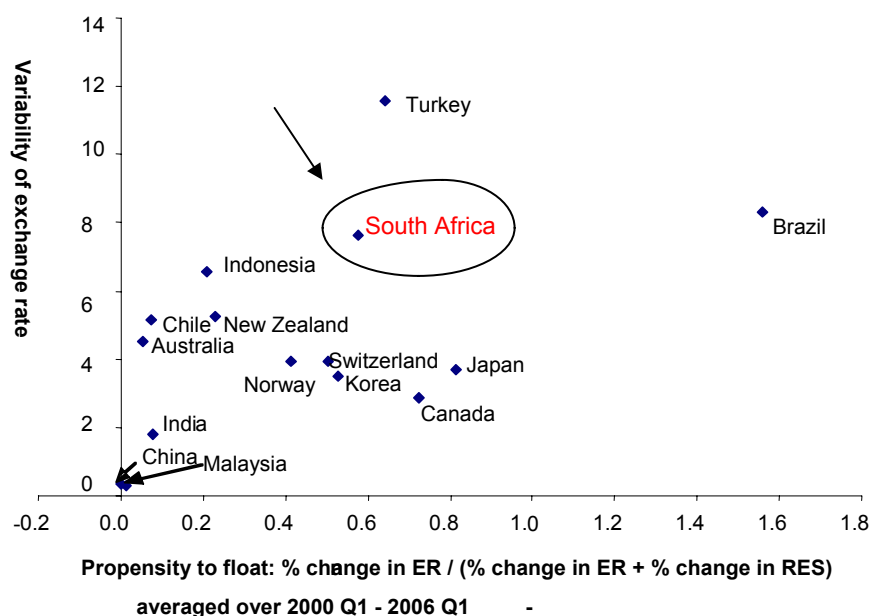
Here we note that the South African monetary authorities, as those in most countries that experienced large inflows after 2002, took the increased demand partly in the form of a higher price (an appreciation of the rand) and partly in the form of a greater supply (more rand assets issued by the Reserve Bank). Looking at exchange rate variability alone – which is high for South Africa – can give a misleading picture of the propensity to intervene or float, because it does not normalize for the magnitude of the shocks. The proportion of the “exchange market pressure” that shows up in the form of appreciation is less than one might think from the official description of the regime as floating. South Africa shares this property with most other self-described floaters.<sup>16</sup> Figure 4 illustrates: Although the tendency to allow reserves to increase looks substantially less than that of three other commodity-exporting inflation-targeting floaters (Australia, Chile and New Zealand) it looks greater than two others (Brazil and Canada). In spite of agreeing on the need for a flexible exchange rate, we believe that such intervention of this sort is to the good. We first explain why, and then consider frameworks for intervention.

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<sup>16</sup> This is the famous “fear of floating” of Calvo and Reinhart (2002).



Figure 4 Propensity to float, and variability of exchange rate



a. Reasons to intervene

One argument for avoiding overvaluation is that the boom may be temporary but private agents do not realize it.<sup>17</sup> The combination is what makes the Dutch Disease a disease. The Dutch Disease can be defined as balance of payments inflows – originally those based on a commodity boom – putting pressure on the real exchange rate, with various inconvenient side effects. The inconvenient side effects range from crowding out of non-commodity exports, to large international debt, to irresistible political temptations for the government to spend the money. Despite these inconvenient effects, the “disease” is not necessarily undesirable. If the private economy is going to respond to price signals by moving into commodities, then it has to move out of somewhere, after all. What makes the pattern truly a disease is if the boom proves to be temporary, in a way that was not adequately foreseen. In the worse cases, after the commodity prices reverse the country is left with a decimated manufacturing export sector, an unserviceable debt, or a bloated government that cannot easily be cut back.

An alternative view argues directly that undervalued exchange rates are good for growth. This so called “mercantilist view” argues that exchange rate policy – more precisely, an undervalued currency– could be used to protect infant industries as a development strategy and has a long tradition in development theory. It has recently enjoyed a minor revival. The issue of undervalued exchange rates has received considerable attention as a result of China’s reluctance to allow its exchange rate to appreciate, a strategy presumed to be aimed at preserving the competitiveness of China’s exports. Some indirect evidence is provided by the role of currencies that have been depreciated (in real terms) in igniting growth accelerations.<sup>18</sup> Undervaluations also

<sup>17</sup> Or even if they realize it that they do not internalize the effect of the appreciation on the survival or the tradable sector. If there is a financial constraint that will hinder the ability of this sector to recover in the future, then there is an argument for why the overvaluation should be avoided. See Caballero and Lorenzoni (2007).

<sup>18</sup> Hausmann, Hwang, and Rodrik (2006), and Johnson, Ostry and Subramanian (2006)

find some support in the work of Johnson, Ostry and Subramanian (2006) who show that overvaluations have important deleterious effects on growth very much along the lines of Dutch Disease. Along the same lines Rajan and Subramanian (2005, 2006) show that overvaluations are responsible for the failure of foreign aid and poor performance of tradable sector production. Finally, Prasad, Rajan and Subramanian (2006) argue that the link between financial integration and poorer growth are the large overvaluations induced by capital inflows.

Rodrik (2007) provides direct evidence on the link between undervaluation and growth in a cross section of countries, as well as by analyzing some historical experiences. Levy-Yeyati and Sturzenegger (2007) and Gluzmann, Levy-Yeyati and Sturzenegger (2007), also address this issue. In a nutshell they look at a cross section of countries, and compute for each of them some measure of intervention to weaken the exchange rate or undervaluation outright. They then relate the level of these interventions to a series of variables such as GDP growth, exports, saving rates and inflation. They test whether countries that have intervened can achieve higher growth rates by sustaining more depreciated currencies. Their results, robust to a series of specifications, seem to suggest that:

1. Countries that actively intervene to prevent an appreciation are, in fact, able to sustain more depreciated currencies rates than in the subsequent years,
2. But this does not come free. Interventions are typically associated with increases in inflation that can be high if interventions are not sterilized.
3. Intervention seems to be correlated with higher output growth, both in the short run (1-3 years) as well as having an effect on trend growth.
4. The effects of the undervaluations seem to operate not so much by stimulating export growth but by increasing savings and investment.
5. Undervaluations are associated with decreases in the rate of unemployment.

Given that the pro-growth consequences of mercantilist interventions are more likely to materialize in the absence of the severe currency mismatches usually found in financially dollarized economies, it is not surprising that the revival of the mercantilist view in the latest years have grown *pari passu* with a gradual decline in financial dollarization in the developing world. For the same reason its results seem particularly relevant for South Africa.

If it is true that the effects arise to some extent via a transfer of income from workers to firms, we need to discuss how this might be growth-enhancing. Diaz Alejandro (1965) was the first to identify this distributional channel. But his view, embedded in the Keynesian framework, revolved around the question of how much of the income that was transferred from workers to capitalists was ultimately spent, and on what. Because Diaz Alejandro was thinking of an agricultural society (his 1965 piece was inspired by Argentina), he saw the rise in consumption by the rich as smaller than the fall in consumption by the poor; hence, the depressed aggregate demand that explained the drop in output.

Aghion et al (2006c, 2006d) also focuses on the effect of savings on growth in small open economies. But in contrast to Diaz Alejandro, they use a general equilibrium model with flexible prices (an assumption that should be more appropriate in a stable context where devaluations or monetary expansions are aimed at containing appreciation pressures), in which savings are the vehicle that domestic financial markets use to collateralize joint projects with foreign direct

investors carrying state-of-the-art technology.<sup>19</sup> More generally, it is easy to conceive a simpler story in which investment by financially constrained firms is sourced directly from internal funds – as is the case in most small and medium enterprises around the world. Thus, the funds that in the earlier version were spent abroad, in the modern version bring about productive investment previously postponed due to insufficient financing. Needless to say, much more empirical testing is still needed to corroborate this hypothesis.

Events in the foreign exchange market change so rapidly that it is hard to comment prescriptively. But if the inflows of recent years are sustained in the aftermath of the global bouts of turbulence, we do have a recommendation, namely that the authorities continue to intervene more heavily than is implicit in the official regime of CPI-targeting floater. One goal is to prevent overvaluation, thereby preserving the non-commodity export sector. Another is to add to the stock of reserves, which is not in the excessive range of many Asian countries.

At the beginning we presented a simple model to explain why we believe that the monetary authorities should not interpret inflation targeting in a narrow or literal way, particularly in the presence of supply shocks such as sharp increases in the price of oil on world markets. To respond to an oil shock by seeking to keep the CPI unchanged would imply sufficient monetary contraction to appreciate the currency and prevent oil prices rising in terms of rand, which is not the right response. The right response to an adverse movement in the terms of trade is, if anything, a depreciation, not an appreciation. The many defenders of inflation targeting will protest that is not what is meant by the regime anyway. But, in the first place, transparency and credibility suggest that it be decided ahead of time what price index is to be targeted (e.g., headline CPI, core CPI, Producer Price Index, or export price index), rather than trying to explain ex post deviations from the price index that had been proclaimed. In the second place, inflation-targeting floaters do behave as if their monetary policies tend to respond to increases in dollar prices of oil imports, to follow the example above, not by ignoring them, but by tightening enough to appreciate the currency.<sup>20</sup> The bottom line recommendation, again, is to exclude oil prices from the CPI target; i.e., *not* to respond to high dollar oil prices by tightening monetary policy and appreciating the currency so as to keep rand oil prices unchanged.<sup>21</sup>

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<sup>19</sup> Unlike in the endogenous growth literature that explains why savings matter for growth, Aghion et al's (2006c, 2006d) mechanism relies on the complementarity of domestic and foreign savings (a link that they verify empirically by showing an association between domestic savings and foreign direct investment).

<sup>20</sup> Frankel (2006).

<sup>21</sup> This lesson is half the argument for the PEP proposal (Peg the Export Price), the argument that improves on CPI targeting. The other half is the argument that improves on a fixed exchange rate: by targeting the export price, the currency automatically appreciates when world markets are strong and depreciates when they are weak, with no painful abandonment of the nominal target. The strict version of PEP would call for South Africa essentially to go back on the gold standard (Frankel, 2002). Under a mild version of PEP, within the existing framework of inflation targeting, the Reserve Bank would simply announce that it is monitoring an index of export prices.

### b. How to intervene

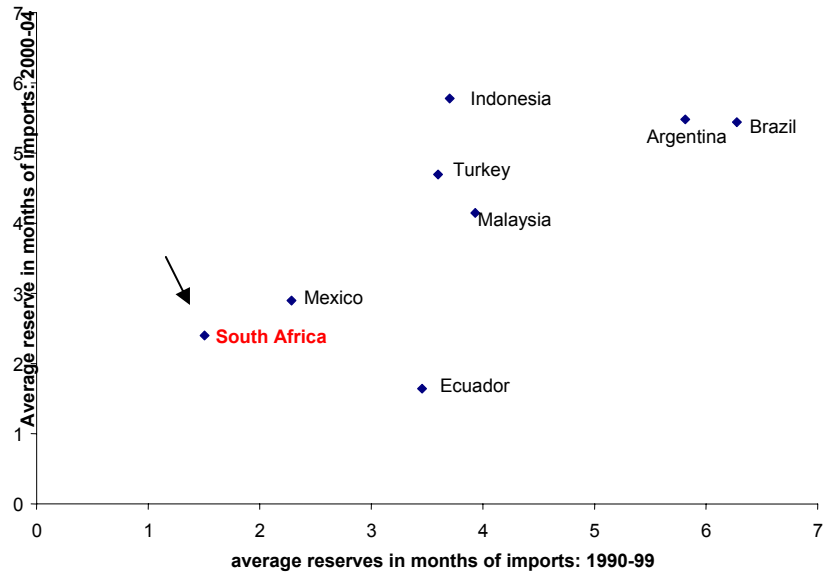
The normal alternative to fluctuations in the exchange rate is foreign exchange intervention in which, as we have seen, the South African monetary authorities do engage. A competitively-valued rand is thought key to developing manufacturing & other non-resource exports, which are in turn key to growth. Our recommendations with regard to the rand can be summarized.

- Preventing overvaluation, & fears of overvaluation, will stimulate output of tradables, which is important.
- Speculative inflows (perhaps based on “carry trade”) probably sent the rand too high in early 2006.
- Intervention can sometimes affect the exchange rate in the short and medium, e.g., by pricking speculative bubbles, without necessarily diverting monetary policy from other goals, such as CPI or nominal GDP targets.
- The SARB could usefully
  - say publicly that, were the rand to return to the value of early 2006, it would view this with concern, implying willingness to intervene to cap the currency at, e.g., an exchange rate above 6,
  - continue to add to reserves, because it started the decade at such a low level.

Two aspects of intervention have not yet been addressed. First, should the authorities sterilize (what are the costs and limits of sterilization?), or should they just allow the money to flow in. On this first question, the authors feel that even in a country without obvious capital controls, there is some scope for sterilization and it can be useful especially at early stages of an unexplained capital inflow. After a couple of years, however, sterilizing large inflows becomes increasingly difficult, in part because it often leads to a rising quasi-fiscal deficit.

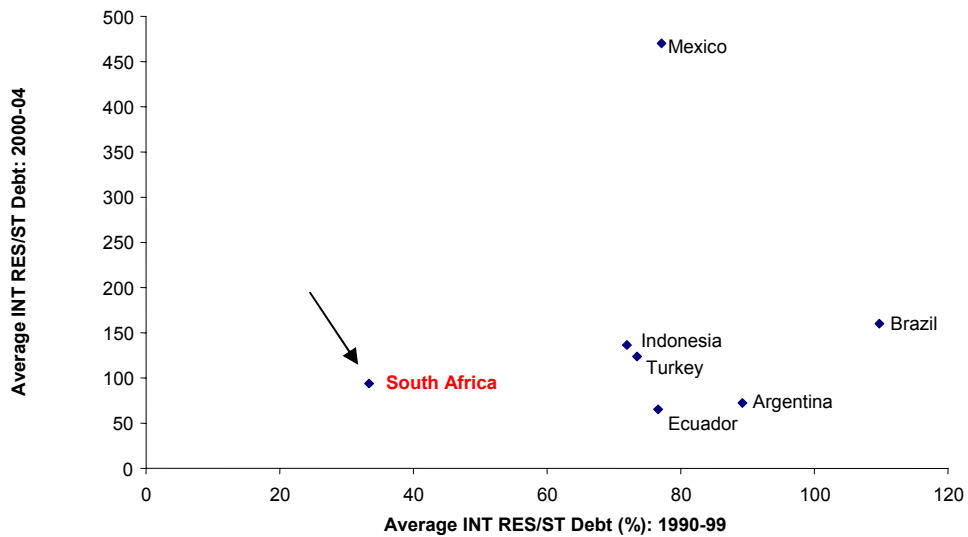
The second question is: how much reserves are enough? The traditional denominator for deciding “how much reserves are enough” used to be imports. As Figure 5 shows, South Africa’s level is still very low by the standards of other emerging market countries.

Figure 5 Average Reserve in months of imports in 2000-04 vs in 1990-99



Source: World Development Indicators

Figure 6 Average International Reserve/Short term debt (%) in 2000-04 versus 1990-99



Source: World Development Indicators

The modern denominator for emerging markets is short-term debt. Figure 6 confirms that South Africa had a very low ratio of reserves also when measured to short-term debt in the 1990s, and suggests that the ratio has moved into mid range since then. It is a wonder of nature that South Africa was able to make it through the 1990s -- with foreign exchange reserves that by another measure were actually negative -- without experiencing the currency crisis that so many other emerging markets did. In that light, perhaps the rand fall of 2001 was not so mysterious after all.

The authorities should be congratulated for rebuilding reserves since that time. But these statistics suggest that South Africa is not in the category of countries, especially Asians, which have exceeded or even reached a level of reserves sufficient to prevent any possible future crises. The country's reserves, as measured here, are in the vicinity of the recommended Guidotti (2003) floor of 100% of short-term liabilities. This is another reason why, assuming that the net capital inflows of 2002-07 continue, it would be prudent to take some of them in the form of higher reserves. This does not preclude taking the advice of those who urge some diversification out of US treasury bills into other assets that pay a higher rate of return.

We said "The normal alternative to fluctuations in the exchange rate is foreign exchange intervention..." But, for the sake of completeness, we should recognize a third option: capital controls. It is not long ago that South Africa had a dual exchange rate.

Some individual countries appear to have been able to make better use than usually thought possible of targeted capital controls. They include Chile's 1990s controls on inflows<sup>22</sup> and Malaysia's 1998 controls on outflows.<sup>23</sup> In general, however, controls have more often been used for ill than good.<sup>24</sup> Particularly for a country like South Africa that already has well-developed financial markets, and that wants to integrate further into world markets, trying to turn back the clock on controls is probably neither feasible nor desirable.

The *removal of any remaining controls on capital outflow*, however, is an obvious way of trying to reduce the net inflow for a country experiencing a larger balance of payments surplus than desired. The capital account liberalization can be a useful signal of commitment to market reform. There is the -- somewhat paradoxical -- chance however that, because liberalization of capital outflows tends to reassure investors that they are more likely to be able to repatriate earnings in the future, they may respond by *increasing* net inflows.<sup>25</sup>

In the South African case international markets have had extensive opportunity to invest locally and have done so. Also, capital controls on non-residents have all but been eliminated and fiscal and monetary authorities in South Africa suffer few problems of credibility. Based on this logic, there seems little reason to think that international investors would greatly increase inflows in response to a removal of controls on residents. Such a move would not do much (if anything) to improve the credibility of policy authorities, but it could actually marginally help to weaken the Rand.

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<sup>22</sup> E.g., Agosin and Ffrench-Davis (1996), Edwards (1998) and Valdes-Prieto and Soto (1998).

<sup>23</sup> Rodrik (1998) and Rodrik and Kaplan (2002).

<sup>24</sup> Frankel and Wei (2004) find that if emerging market countries liberalize their capital controls, they are less prone to crises, not more, and summarize the literature. Other overviews of the literature include Dooley (1996); Edison, Klein, Ricci, and Sloek (2004); Eichengreen and Mussa (1998); Frankel (1999); Eichengreen and Leblang (2003); Henry (2007), Rodrik (1998); and Prasad, Rogoff, Wei, and Kose (2007).

<sup>25</sup> Bartolini and Drazen (1997); Laban and Larrain (1997).

## 6. Choice of exchange rate regimes

There is a huge literature on a country's choice of whether to fix or float its currency, or follow an intermediate exchange rate regime.<sup>26</sup> There are important pros and cons to each regime. As a rule, most emerging market countries have moved away from pegged exchange rates towards floating, over the last 30 years, and especially in response to the currency crises of the 1990s. But some countries are too small to merit their own floating currency. No single exchange rate regime is right for all countries. The balance of pros and cons depends on local conditions.<sup>27</sup>

Some local conditions suit a country for exchange rate flexibility. They include traditional optimum currency area criteria such as a country's size, low openness, high labor mobility, and idiosyncratic cyclical shocks. Economists in the 1990s were pre-occupied with the issues of absolute credibility and the conditions that would suit a country to an institutional rigid fix, such as a currency board.<sup>28</sup>

Since then two partially-forgotten criteria have been revived. One is the extent of financial development. Aghion, Bacchetta, & Ranciere (2005, 2006) study the interaction between choice of regime and development. They find fixed rates are better for countries at low levels of financial development: because markets are thin, benefits of accommodating real shocks are outweighed by costs of financial shocks. When financial markets develop, exchange flexibility becomes more attractive. Then, they find, real exchange rate volatility is actually *good* for growth. Their preferred measure of financial development is the ratio Private Credit/GDP and the estimated threshold above which flexible rates are more attractive is 40%.

The other is the incidence of trade shocks. Textbooks traditionally prescribe that a country that experiences volatile global markets for its export or tradable commodities – which includes particularly mineral producers – should float so as to allow exchange rate fluctuations to accommodate changes in the terms of trade automatically. Terms-of-trade volatility has returned as a prominent issue in the current decade, in part because of the big movements in commodity prices.<sup>29</sup> Prices of oil, zinc, copper, platinum & other minerals hit record highs in 2006-2007. The increase in commodity prices has implied a favorable terms of trade shock for some -- e.g., oil producers like Nigeria or Iraq and copper-producers like Zambia or Chile, but an unfavorable terms of trade shock for others – e.g., oil importers like Japan.

Levy Yeyati, Sturzenegger and Reggio (2005) compute how the choice of exchange rate regimes relates to the fundamentals identified by the theory. Their results are summarized in figure 7, with vertical lines corresponding to where South Africa stands within the range spanned by each variable. The figure shows the probability of countries choosing a fix, both for industrial (green lines) and non industrial countries (blue lines). South Africa can be classified with the group of industrial countries given its high level of financial development.

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<sup>26</sup> Frankel (2004) offers a comprehensive overview.

<sup>27</sup> See Levy Yeyati, Sturzenegger and Reggio (2005) for an interpretation of how optimal regimes depend on each country's fundamentals.

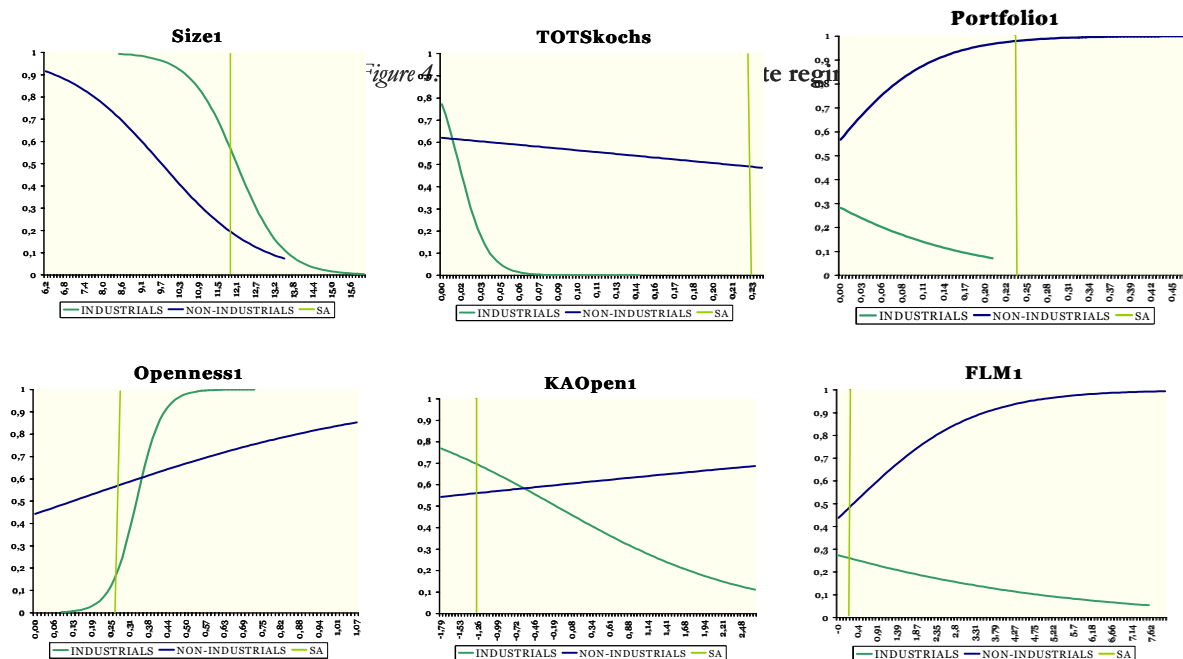
<sup>28</sup> The collapse of Argentina's convertibility plan in 2001 dampened enthusiasm not only for currency boards, but also for the Corners Hypothesis, the conventional wisdom of the 1990s, which held that countries should either institutionally fix or else freely float, but avoid intermediate regimes like target zones.

<sup>29</sup> Hausmann, Panizza and Rigobon (2006) believe that larger shocks explain only part of why real exchange rates are so much more volatile for developing countries than for industrial countries.

The graph shows how the choice is related to several key variables identified in the literature on exchange rate regimes: country size (Size), openness (Openness), volatility of terms of trade (ToT), de jure capital account openness (KA openness), de facto capital account openness (Portfolio) and dollarization (FLM) among others. The results indicate that smaller and more open countries tend to fix. Regarding capital flows, the effect differs for developing and non developing economies. Developed countries facing volatile capital flows tend to float, emerging and less developed economies tend to fix. Given where South Africa stands, in terms of capital flow volatility, when classified with the group of industrial countries it should float. No developed country facing that much volatility fixes. And while dollarization is not an issue for South Africa (notice it is way to the left in the range), the data show that it is exposed to extreme volatility in its terms of trade, in fact one of the highest in the world, which points directly towards the need to float. Its relative size and openness also point in the same direction.

In summary it is clear that South Africa should stick to its floating exchange rate regime. Even though many countries have given up explicitly targeting the exchange rate, let alone pegging it, monetary policy still needs a nominal anchor. Inflation-targeting is the new reigning favorite, having replaced exchange rate targets. But it, like the other possible choices for nominal anchor, has its drawbacks which we have discussed above.<sup>30</sup>

Figure 7 The determinants of exchange rate regime



<sup>30</sup> The PEP proposal seeks to avoid this drawback of CPI targeting. The narrow form of PEP (pegging to gold, for a gold exporter) is explained in Frankel (2002), and the broader form (targeting an index of export prices) in Frankel (2005).



## 8. Making Inflation Targeting Appropriately Flexible

We accept that inflation targeting (IT) is to be the overall framework of monetary policy, as in so many other countries today. IT is the reigning champion among monetary targeting regimes, for better or worse. So say many academic economists, central bankers, and the IMF. It is not hard to explain the ascendancy of this approach to monetary policy over the last decade:

- The gold standard & monetarism had become discredited by the mid-1980s.
- Exchange rate targets played a useful role in stabilizations of 1985-1994, but subsequently outlived their usefulness for most medium-sized countries, particularly in the currency crises of 1994-2002.
- For many, that leaves IT the only plausible candidate for nominal anchor.

But this leaves open the question how narrowly or broadly inflation-targeting should be defined. According to the broadest definition, the central bank declares explicit long-term goals for inflation, e.g., the Federal Reserve Board's "comfort zone" of inflation under two percent or the similar target of the European Central Bank. It is hard to object to this proposition, especially given the absence of a long-run tradeoff with GDP. For some, that proposition, plus perhaps some additional transparency, *is* IT.

According to the narrowest definition of IT, the central bank declares short-term goals for the CPI, and does its best to hit them, to the exclusion of other considerations. For some, that is inflation targeting, although if asked about what to do in the event of substantial supply shocks, they are forced quickly to concede that of course some *ex post* deviations must be allowed, with appropriate rationalizations.

There is a lot of room in between these two poles. We believe that a yearly commitment to a CPI goal to the exclusion of other considerations is unwise. Our position is closer to the broad definition – the long-term target for inflation – than the narrow definition. That leaves open many questions about the operation of monetary policy in the shorter term. Flexible inflation targeting allows for some weight on real economic activity in the shorter or medium term; this idea motivates the remainder of the paper. Separately, one might also interpret flexible inflation targeting as allowing for some weight on the exchange rate; this idea was already covered in earlier sections.

As we saw at the outset, if a CPI target is taken literally it may destabilize output unnecessarily. First, it can make monetary policy procyclical in the event of supply shocks. We should want to take an adverse supply shock partly as temporarily higher inflation in the CPI, not all as lost output. The case is particularly clear if the adverse supply shock is an adverse shift in the terms of trade. Recall the example of an increase in the dollar price of oil on world markets. A strict interpretation of CPI targeting would tell the South African Reserve Bank that it has to tighten money so much, and appreciate the rand so much, that the oil price is unchanged in terms of rand. But a country's currency should *depreciate* in response to adverse shift in terms of trade, not appreciate.

In practice, nobody proposes taking a CPI target literally. The central bank may explain *ex post* that it is temporarily deviating from target due to the supply shock. Or it may say *ex ante* that its target is core CPI, "excluding volatile food & energy." But both approaches are less than transparent to the person in the street, who is being told he shouldn't worry when the price of gasoline (petrol) goes up. In addition, if the mineral price that goes up [or down] on world markets is an *exported* commodity (gold, platinum...), then there *should* be some appreciation [or

depreciation] of the rand, to accommodate the change in the terms of trade. But core CPI excludes it.

*Our proposal for an intermediate-term target*

If the inflation target is to be a long-term goal -- comparable to the Federal Reserve's "comfort zone" of just under 2 percent -- that leaves the question whether it is advantageous for the central bank to announce some intermediate target, say on a yearly basis. The argument in favor of an intermediate target is that it enhances transparency, accountability, and monitorability, giving the public confidence that the central bank is doing what it says it will do -- assuming of course that the target is not habitually or massively missed. If the decision is that an intermediate target should indeed be set, it should be consistent with a targeted inflation path that moves in future years from whatever the recent inflation rate has been, gradually toward the long-term goal. But the intermediate target itself need not necessarily be phrased as an inflation number or range, even though this is what many of the ascendant inflation-targeters have in mind.<sup>31</sup>

With this in mind, there are several desirable characteristics for the choice of an intermediate target variable. It should be:

- i. Easy and unambiguous to measure,
- ii. Familiar to the public, and, most importantly,
- iii. Robust with respect to shocks

Regarding criterion (ii), the variable in question should be something more comprehensible and familiar to the public than the "core Personal Consumption Expenditure deflator," which is the Federal Reserve's preferred measure. The Fed has good reasons for viewing this as a reliable indicator of inflation; but that is not the same thing as an intermediate target that is shared with the public in the interest of transparency. Worse than the obscurity of this particular measure of inflation is that, when the policy-maker tries to explain the meaning of the word "core" to the person-in-the-street, the only reaction is likely to be cynicism. "Let me get this straight. You are claiming to stabilize my cost of living; but when gasoline prices go up, you say that doesn't count." Credibility is supposed to be the whole point of announcing an intermediate target, but excluding the "volatile food and energy components" does not enhance credibility.

Assume, then, that the authorities announce to the public a simpler concept, such as headline inflation as measured by the CPI, PPI, or GDP deflator. Regarding criterion (iii), the concern is again supply shocks. In the case of countries with volatile terms of trade, this includes in particular terms of trade shocks. A lack of robustness with respect to terms of trade and other supply shocks, renders the chosen target variable problematic in two senses. First, *ex post*, such shocks will force the monetary authorities to choose between needless fluctuations in the real economy and abandoning the target. Neither is desirable. Second, *ex ante*, the proclaimed target will be less credible if it is not seen as sustainable in the event of shocks. A common response by proponents of inflation-targeting, whether central bankers or academic economists, is that in the event of a supply shock such as an oil shock, the authorities should simply suspend the inflation target and explain the circumstances.<sup>32</sup> But if credibility/ transparency/monitorability is supposed to be the whole point of announcing an intermediate target, then suspending it in the event of an adverse supply shocks is likely to engender as much cynicism as having announced a target for core inflation in the first place -- probably more.

<sup>31</sup> Three typical of studies of inflation targeting that emphasize open-economy aspects, but do not have developing countries particularly in mind, are Bernanke, et al (1999), Svensson (1995), and Truman (2003).

<sup>32</sup> E.g., Giavazzi, Goldfajn and Herrera (2005).

We propose that the intermediate target be nominal GDP (or nominal demand). To repeat: the target for nominal GDP would be consistent with the longer-term target for inflation.<sup>33</sup> Indeed if the longer-term target were phrased in terms of the nominal GDP deflator, then the nominal GDP target could be decomposed for notional purposes into an expected path for inflation and an expected path for real GDP. But one advantage of designating nominal GDP as the annual intermediate variable is that it is an easier quantity to measure than the components, GDP deflator and real GDP, which even in the most advanced of economies are subject, for example, to various index number problems. More importantly, nominal GDP is an easier target to *hit* than its components, because monetary policy has to pass through nominal demand in order to influence either inflation or real growth. (This is also one of several reasons why nominal demand would theoretically be better than nominal GDP.<sup>34</sup> The argument on the other side, for nominal GDP instead of nominal demand, is ease of comprehension.) In particular, nominal GDP is far more robust with respect to supply shocks and import price shocks than is the CPI or other price target. A rigid nominal GDP target would absorb an adverse supply shock half in higher prices and half in lower output. This is surely closer to the optimal discretionary response that a central bank would choose if unconstrained by any intermediate targets or other rules or credibility issues, as compared to a rigid inflation target which would force the economy to absorb the entire impact in the form of a recession.

Many prominent economists supported nominal GDP targeting in the 1980s after large velocity shocks had discredited targeting of the money supply, including, James Tobin, Martin Feldstein, Robert Hall, Greg Mankiw, Charles Bean, and others.<sup>35</sup> It is a bit of a puzzle why no central bank has adopted it. It was not even seriously considered by the European Central Bank when it was designing its pillars. Should small developing countries be suspicious of a proposal that no large industrialized country has ventured to try?

Warwick McKibbin has argued that nominal GDP targeting is a more relevant proposal for developing countries than for industrial countries because they suffer greater supply shocks (e.g., weather events) and terms of trade shocks (e.g., mineral commodity prices) than do industrialized countries.<sup>36</sup> Furthermore, their governments may have less credibility historically than the Federal Reserve, Bundesbank, or ECB, so that explaining away deviations from a CPI target is more problematic. Some proponents recognize that inflation targeting is more difficult in emerging market countries than in industrialized countries, and argue that they should adopt more transparent institutions so that it can be made to work.<sup>37</sup> But this seems like the “tail wagging the dog.” The usual view is that less developed countries are often less developed *precisely because* of a shortage of strong and transparent institutions. Central bank targeting is supposed to help address this shortage, rather than requiring that the deep institutional problems be addressed first. Some proponents of inflation targeting attribute some of its difficulties in emerging markets to fear of

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<sup>33</sup> As we understand it, the monetary policy regime of the SARB presently sets a target in the form of forecasted inflation at a continuously receding horizon of about two years. As part of the strategy to implement this target, the Bank considers the impact of demand growth relative to capacity. Thus our proposal might be considered as not radically different from the current practice, but with more public emphasis on a one-year target for nominal income or nominal demand.

<sup>34</sup> Another reason is that unanticipated fluctuations in inventories show up in GDP, but not in demand, making the latter sort of target easier to hit, a point emphasized by McCallum (2007).

<sup>35</sup> References are given in Frankel (1995).

<sup>36</sup> McKibbin and Singh (2003). Of course, South Africa has some of the attributes of an industrialized economy.

<sup>37</sup> Mishkin (2004); and Fraga, Goldfajn and Minella (2003), who attribute the difficulties facing emerging market central banks to “more pronounced external shocks, lower credibility, and lower level of development of institutions.”

floating, and exhort central bankers to refrain from intervening in the foreign exchange market.<sup>38</sup> It is fairly clear that central banks in developing countries that officially float freely and target inflation, do nevertheless react to the exchange rate *de facto*.<sup>39</sup>

But, again, the question should not be what countries must give up to make inflation targeting work, but rather what is the best regime. The CID team working in South Africa is concerned about three implications of ignoring the exchange rate altogether. First, that an overvalued currency might discourage important new export industries. The exchange rate may not be currently too far out of range, but it could become over- or under-valued in response to specific shocks. Second, that monetary policy may become excessively procyclical. We provide some evidence that this procyclicality has increased, not decreased, as the SARB has improved its credibility. Finally, to the extent that floating exchange rates might sometimes be subject to speculative bubbles or other gratuitous volatility, there is a strong argument against central banks banishing the exchange rate from their reaction functions. Financial markets might pass the test of the “efficient markets hypothesis” and yet send price signals that are inefficient for the allocation of real resources in the economy.<sup>40</sup>

How would nominal GDP targeting work? The central bank, perhaps in consultation with the government, would each year announce a target range for nominal GDP, with a realistic band around it. At the same time, they might announce accompanying forecasts for the year’s rate of real growth and inflation, but would explicitly point out their inability to influence whether the nominal income target would in fact turn out to break down in the way specified. The central bank might also announce a target for nominal demand at the same time, for more technically inclined observers in the financial markets.

It has been objected -- in the South African context as in others -- that if the monetary authority were to set a target for nominal GDP, it would leave itself political liable for an implied *real* GDP target: pressure to set it the target high and blame if it is not attained. Under a regime of nominal GDP targeting, the SARB would need to make it clear to the public that nominal GDP is a very different thing from real GDP, and that it has no control over how the target number for nominal GDP ends up dividing between inflation and real growth. If rapid productivity growth succeeded in translating a 9% target for nominal GDP into 7% real growth and 2% inflation instead of 2% real growth and 7% inflation the SARB would be the first to celebrate, but could not and would not take credit for such a happy outcome. Conversely it should not be blamed if slow productivity growth or other adverse supply shocks gave a worse combination of growth and inflation.

The interest rate would remain the operational tool for attaining the intermediate target. The authorities would continue to look at many indicators, including the exchange rate, commodity prices, housing prices, stock prices, employment, etc. But the commitment would be to the target for nominal GDP on an annual basis, and inflation in the long run.

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<sup>38</sup> Caballero and Krishnamurthy (2003), and Jonas and Mishkin (2005).

<sup>39</sup> E.g., Edwards (2006), p. 29.

<sup>40</sup> Devereux and Engel (2006) and Caballero and Lorenzoni (2007) provide recent formalizations. Hausmann, Panizza and Rigobon (2006) argue that larger shocks in fundamentals for developing countries explain at most part of why real exchange rates are so much more volatile there than for industrial countries.

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