Reflections on the South African Rand Crisis of 1996 and Policy Consequences*

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JANINE ARON
Centre for the Study of African Economies, Institute of Economics and Statistics, University of Oxford, Manor Road, Oxford OX13UL, UK
& Centre for Research into Economics and Finance in South Africa, LSE, London

and

IBRAHIM ELBADAWI
African Economic Research Consortium, Nairobi, Kenya
& The World Bank, Washington D.C., USA

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Abstract: *After South Africa's democratic elections in 1994, large capital inflows were induced by the cessation of trade and financial sanctions, improved creditworthiness and a liberalised capital account for foreigners. The flows were managed in a classic trade-off between currency stability, and raised interest rates to counter inflation resulting from a credit boom and partially sterilised intervention. In early 1996, the currency suffered a speculative attack. Using a theoretical model of currency crises, we present some empirical results suggesting the importance of economic fundamentals and policy credibility as determinants of investors' devaluation expectations prior to the crisis. Poor growth associated with subsequent protracted currency volatility and high interest rates argues for a range of complementary policies to manage inflows in South Africa. These include reserve requirements on certain inflows, prudent further liberalisation of domestic exchange controls, improved private and government savings policies, a medium-term public debt framework and closer monitoring of risk management by banking and other financial institutions.*

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1. Introduction

During the mid-1990s, South Africa became one of the leading emerging markets for the increasingly large flows in private capital finance, attracting about half of the private capital flows to Sub-Saharan Africa (SSA)[1]. From 1995, South Africa was included in key emerging market indices - such as the International Finance Corporation (IFC) emerging markets index - further enhancing investment flows. Of the 27 countries included in the index, South Africa ranked highest in terms of stock exchange capitalisation in 1995 before the rand crisis.[2] During 1997, South Africa was the only country in SSA to engage in international bond and equity issues, and also accounted for almost three quarters of the total syndicated loans extended to SSA. Moreover, the size of South Africa's domestic bond market as a percentage of GDP ranks highest amongst the ten largest markets for developing countries, and features in J.P. Morgan's Emerging Local Markets Index. At a time when much of Africa is experiencing problems of aid-dependence and vastly under-capitalised economies, the lead taken by South Africa to enhance its share of private sector development finance, and some of the difficulties it has experienced, should provide important lessons for SSA.

Following the remarkable democratic transformation and elections in April, 1994, the government made an explicit commitment in at least two highly publicised programmes (the RDP, and, in 1996, the GEAR[3]) to a long-term development strategy for generating rapid and widely-shared growth, but with a firm commitment in the short- to medium-run to macroeconomic stability. It appears that the initial assessment by international capital markets was of a sustained growth path, where the strength and sophistication of its financial markets, a strong civil society and transparent and democratic governance were seen as a comparative advantage of South Africa.

Yet the overall performance of the South African economy since the elections has been disappointing. Real GDP growth is projected to have slowed to 1.5 percent in 1998[4], and was only 1.7 percent in 1997, compared to 3.4 and 3.2 percent in 1996 and 1995, respectively. Apart from South Africa's labour market inflexibility[5], and a declining gold price from late 1996, probably the most important factor affecting the growth performance has been the mode of liberalisation of the capital account and policy management of the large and volatile capital inflows from 1994.

Capital flows to the country increased markedly after the elections, though from a very low base following over a decade of financial sanctions (Table 1). Flows accelerated with the effective removal of exchange controls on non-residents in March, 1995, after the long-established dual exchange rate system was unified. However, these inflows have tended to be dominated by more volatile short-term loans and portfolio equity and bond flows, with foreign direct investment (FDI) a fairly minor component

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[1] Private flows to SSA rose from US$4 billion in 1996 to an estimated total of US$8 billion in 1997. An increase in bank lending from foreign commercial banks, encouraged in South Africa's case by high domestic interest rates, accounts for much of this rise (Global Development Finance, The World Bank, 1998).

[2] By turnover South Africa ranked lowest, however, reflecting the highly illiquid nature of the exchange, dominated by large conglomerates (Emerging Market Stockmarket Factbook, IFC, 1995, and see also CREFSA Quarterly, July 1996).

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

[4] Projection by the banking corporation NEDCOR (SA), "Guide to the Economy", April, 1998. This figure contrasts with a projected 3 percent real GDP growth rate for 1998/99, announced by the Minister of Finance (Budget Speech, March, 1998).

[5] Labour market inflexibility was emphasised in the GEAR macroeconomic strategy document of 1996.

(e.g. in 1995-96, FDI was under 5 percent of total inflows)[6]. With a large proportion of inflows of a more short-term nature, the economy remains highly vulnerable to flow reversals.

The external sector has experienced several exchange rate crises. The initial crisis was triggered in February, 1996, and volatility persisted through July, 1996 (Figure 1). Contributing factors include investor uncertainty about economic policy arising from perceived differences within the government, and also between the government and other key stake holders (e.g. COSATU[7]), due to the inherently conflicting policy targets and instruments between the short- and longer run, and between the real and financial sectors of the economy. There has been considerable "hysteresis" in the real economy in response to this shock: that is, persistent or longer-term negative real effects from short-term financial volatility, including diminished investment and growth.

Later crises occurred in October, 1996 and November, 1997, triggered largely by contagion effects from the Asian crisis (and also falls in the price of gold and other metals). More recently, from April, 1998, speculation saw the rand reach a low of R6.35/$ in July, 1998 (i.e. some 40 percent below its average value of R3.61/$ between the elections and the first crisis). While investors have generally revised sentiments about emerging markets in the aftermath of the Asian crises, nonetheless, domestic factors such as the widening current account deficit and poor growth prospects have damaged investor confidence in South Africa. Moreover, by the end of 1997, gross gold and other foreign exchange reserves measured only about ten weeks' worth of imports of goods and services.

This paper examines the management of capital inflows to South Africa after the elections, and the policy consequences. Focusing on the initial February, 1996 crisis, we apply a "second generation" theoretical model of currency crises due to Agenor and Masson (forthcoming), which emphasises the authorities' classic tradeoff between stabilising the currency and maintaining target interest rates in the face of a shock to reserves (in this case, through managing increased inflows). Empirical results suggest the importance of both economic fundamentals and policy credibility in the formation of private sector devaluation expectations prior to the crisis.

The outline of the paper is as follows. Section 2 discusses the explicit and implicit policy objectives of the South Africa Reserve Bank and the modes of intervention in support of these objectives during 1994-96. In Section 3, we give a brief theoretical exposition of a "second generation" currency crisis model, and interpret evidence from an econometric estimation of this model on factors triggering the crisis of early 1996. Section 4 outlines current exchange rate policy management options, and argues for various complementary policies to mitigate the negative economic consequences of highly volatile, short-term inflows. Finally, Section 5 offers some brief lessons for other African countries from South Africa's experiences and those of other crisis-affected countries.

2. Objectives and Modes of Intervention of the Reserve Bank in 1994-96

It is clear that the Reserve Bank had two major policy objectives during the period of large net capital inflows from April, 1994 until the crisis in February, 1996. These objectives were supplemented by the subsidiary goals of the Reserve Bank eventually to withdraw completely from the forward foreign

[6] Note, however, that more lenient authorisation procedures on domestic capital outflows meant South Africa was the sixth largest outward foreign direct investor amongst emerging countries in 1996 (Global Development Finance, The World Bank, 1998).

[7] The Council of Trade Unions of South Africa, is the largest of South Africa's three labour union federations, with 1.7 million members.

exchange market[8], and to accumulate a level of foreign reserves closer to 12 weeks of imports than the 5 weeks of imports pertaining in June, 1994 (Stals, August, 1994),

The *first* of the main objectives was inflationary control. Explicit monetary growth targets (M3) have been announced annually from 1986, following the recommendations of the de Kock Commission (1985). Targets were chosen both to accommodate projected real GDP growth and to contain inflation. Inflationary control has operated mainly via the effects of changes in the bank interest rate on short-term market interest rates. In practice, to reduce the demand for bank credit, the Reserve Bank has increased the bank interest rate at which it provided discount-window accommodation to banking institutions, against the collateral of various government bills. The supply of credit (a major component of money supply changes in South Africa) could be influenced by open market operations and various other policies acting on overall liquidity. By creating a persistent "money market shortage" (where banks are in need of accommodation), and setting the bank rate at a relatively high level, the commercial bank rates have typically been closely linked to the bank rate. According to the Reserve Bank, monetary control thus operates indirectly through the slowing of the demand for money, with an estimated lag for its ultimate effect on inflation of over 12 months (e.g. Stals, September, 1995).

In Figure 2, target growth zones and actual money growth outcomes for the 1990s are shown, where an increasing tendency to deviate from targets is apparent in the later years. However, it should be noted that in practice these targets have not been rigidly adhered to. Extensive financial liberalisation and innovation, especially in the 1990s, amongst some other factors, may have altered the relationship between inflation and the money stock (to the extent that it existed). In recent years, a broader set of indicators has been adopted than merely M3 targets to guide interest rate policy. The actual interest rate rules followed, that is, the relative weights attached to these different indicators, are not known, however, which reduces the transparency of policy.[9]

Inflation figures show average annual levels of 11.3 percent during 1990-1995, and 7.4 and 8.6 percent for 1996 and 1997, respectively (see also Table 1). Nominal wage settlements in the 1990s have typically approached 10 percent growth per annum, so that there has been little nominal price inertia. Moreover, the import intensity of the economy suggests a fairly high pass-through rate to inflation from depreciation of the exchange rate. This fact and the inflationary expectations suggest inflation is "endemic", or structurally inbuilt in South Africa. In the past, given high budget deficits - see Table 1, the main burden of adjustment has fallen on monetary policy.

The *second* of the major objectives was stabilisation of the nominal exchange rate. However, this objective was not made explicit, and there was no announced target or target zone for the nominal rate[10]. The exchange rate had been designated "floating" from 1979 in the context of a dual exchange rate regime, though in practice considerable intervention occurred in the foreign exchange market[11]. In the

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[8] Spot sales of commodities, and credit purchases of intermediate goods imports, have tended to produce an unbalanced forward book. Coupled with the provision of forward cover at subsidised rates by the Reserve Bank, particularly for parastatals during the sanctions era, this has at times induced large (fiscal) losses on the forward book. For details on the Reserve Bank's changing role in the forward market in South Africa, see Aron et al (1999).

[9] From March, 1998, a more flexible system of monetary market accommodation has been introduced, replacing overnight collateralised lending at the discount window by daily tenders of liquidity, with repurchase transactions.

[10] There has been some confusion as to the actual exchange rate policy followed by the Reserve Bank in this period. One commentator thought that the Reserve Bank was targeting a real rate (e.g. CREFSA, April, 1996), though in fact the article makes reference to statements made by the Governor *after* the crisis.

[11] For a detailed history of exchange rate policy and management in South Africa, see Aron, Elbadawi and Kahn (1997).

uncertain atmosphere prior to the elections there were huge capital outflows. Despite borrowing from the IMF and significantly increasing other short-term foreign borrowing, the Reserve Bank was unable to prevent a nominal effective depreciation of close to 19 percent between January, 1993 and the end of July, 1994 (real depreciation was about 10 percent).

After the election, capital inflows resumed strongly, and there was heavy intervention in the market to prevent appreciation of the rand, at the expense of monetary targets (see Stals, October, 1995). During the 21 months from the elections the bilateral rand/dollar exchange rate moved by no more than 2 percent from R3.65/$, while in April, 1995 to January, 1996, the range was even narrower, moving in an "implicit" band of R3.65± 1 percent (see Figure 1). Arguably, the stylised fact of the steady bilateral rate in the face of huge inflows was correctly viewed by investors as a "one-sided" implicit nominal target (e.g. Union Bank of Switzerland, February, 1996). Yet, despite huge and persistent intervention on behalf of the rand, the Reserve Bank argued that the rand was floating and intervention was only to smooth temporary and reversible short-term fluctuations (Stals, October, 1995).

A highly pertinent factor in South Africa's exchange rate management in the period was the presence of exchange controls on both foreign and domestic investors at the time of the elections. The March, 1995 unification of the dual exchange rate system - which had operated since the 1960s in one form or another save briefly during the abortive unification of 1983-85 - effectively ended exchange controls on foreign investors. In repeated policy statements, the Reserve Bank also made a firm commitment to reduce gradually, and eventually eliminate, exchange controls on domestic residents (e.g. Stals, October, 1995). Prior to the Mexican and related crises of early 1995, the demands from domestic business lobbies and others for a "big bang" removal of domestic exchange controls were vociferous. Thereafter they ameliorated somewhat, though remaining a source of pressure on the authorities.

As with all gradual liberalisations, the Reserve Bank laid itself open to speculation on the timing of liberalisation. Speculation was aided, perhaps, by the Bank's response to domestic pressure for decontrol, by indicating the "conditions" that would have to be met before further liberalisation. These included a significant reduction in the size of the forward book, and a level of reserves close to 12 weeks of imports. Caution was partly due to uncertainty about the extent of the domestic outflows after decontrol and hence the size of the depreciation of the exchange rate (estimates of the size of potential outflows have varied considerably). Further, the Bank stood to lose significantly on existing forward contracts by a substantial depreciation. Nevertheless, risk-averse investors would have recognised that the partial decontrol of domestic flows offered the authorities a potential pressure valve should sterilised intervention become too costly in stabilising the exchange rate.

In sum, the main objectives of the Reserve Bank were two-fold, to contain inflation through an interest rate policy based on explicit monetary targets, and to stabilise the nominal exchange rate, *de facto* by an implicit one-sided target. This policy choice resembles that of a host of countries which have been subject to exchange rate crises. Two "targets" may be feasible in the absence of large changes in capital flows. However, with a persistent increase in flows there is a policy trade-off between abandoning the exchange rate "target", or continuing with it at the expense of higher inflation, interest rates and eventually reduced output. With persistent capital flows, this type of policy conflict and the inescapable abandonment of one of the targets is the focus of the "second generation" models of currency crises (e.g. Oskan and Sutherland, 1995), to which we turn in the next section for an application to South Africa.

To secure its dual objectives under increased capital inflows, the Reserve Bank continued to announce monetary targets, but accumulated foreign reserves, engaging in various actions to offset (sterilise) the otherwise expansionary effects of such an accumulation on the monetary base[12]. As we

[12] Actions to drain liquidity potentially included shifting government deposits from commercial bank accounts to the Reserve Bank, more liberally authorising foreign asset swap agreements, selling government stock (open market operations), issuing new Reserve Bank bills or Special Treasury Bills, adjusting the asset portfolio of the Corporation for Public Deposits, increasing cash reserve requirements on commercial banks and facilitating the extension of forward contracts (see Aron et al, 1999).

have mentioned, achieving a higher level of reserves was certainly an important intermediate target. The change in gross and net reserves is shown in Figure 3. Initially the Bank was able to reduce and then eliminate liabilities on reserves, so that a far greater movement is apparent in the net than in the gross reserves. However, from October, 1995, the gross and net reserves were close to being equalised and then the monthly rate of increase of gross reserves began to accelerate, reaching 17 percent by the end of December, 1995. Moreover, due in part to hedging operations of gold producers, between the end of March, 1995 and mid-February, 1996, the size of the forward book was reduced from US$28.6 billion to US$11.1 billion, a reduction of over 60 percent (CREFSA, April, 1996).

Sterilisation of the effects of the reserve accumulation actually began only late in 1994, despite considerable intervention in that year, and, moreover, began only gradually (Stals, October, 1995). Consequently, large increases in the liquidity of the banking sector had induced a typical "endogenous" financial liberalisation, for a given level of bank supervision[13]. There was a massive growth of credit to the private sector (Table 1), partly accounted for by demand-led pressures from new borrowers under the new political dispensation. However, the Reserve Bank's Supervision Department reports (which, moreover, refer only to the banking sector, and not to the less well-regulated and sizeable non-bank financial sector) also show clear evidence of increased riskiness of lending by banks.

In consequence, the bank rate was raised, minimum cash reserves requirements for banks increased, and open market operations initiated. By about mid-1995, money market conditions were considerably tighter (e.g. Reserve Bank Quarterly Bulletin, March, 1996). Yet by the end of 1995, sterilisation was again reduced in scope, despite the fact that the deviation of the money supply from its target was still increasing.

It is by now generally accepted that while temporary changes in flows can probably be effectively sterilised, it is not possible to sustain a sterilisation of permanent flow changes (e.g. see Calvo et al, 1993). The fiscal costs of a lengthy sterilisation can be prohibitive, and as the market becomes saturated with bonds, higher interest rates are required to persuade investors to hold new bonds. Moreover, new speculative inflows in reponse to the even more favourable interest differential could then exacerbate the problem. Even if the resulting fiscal cost was borne for a time, eventually the level of interest rates would so far exceed the target rates that the resulting contraction in output would force abandonment of the exchange rate target (e.g. the U.K. case in 1992, see Masson, 1995).

The pertinent question then is whether the inflows should have been regarded as temporary, or as transitional flows toward a new level of permanently increased inflows, compatible with a more appreciated long-term real exchange rate. Clearly the latter is appropriate (see Aron, 1997). South Africa since mid-1994 has undergone a major transition on the external front due to more normalised international relations. Trade policy continues to be progressively liberalised, while trade volumes underwent large corrections with the end of trade sanctions. The abolition of financial sanctions and improved creditworthiness allowed South Africa for the first time in decades to attract inflows apart from merely short-term trade finance. This profound regime change signalled a new era of larger, sustainable inflows compatible with macro-economic fundamentals and debt levels (see Edwards, 1997), rather than largely dictated by political factors, as previously.

The judgement as to sustainable levels of flows is in general difficult (though Edwards has suggested some simple rules of thumb), but will be especially so in a period of economic transition. Note that the predominance of portfolio flows relative to FDI flows need not imply that all new flows were necessarily "temporary" in duration. While speculative flows may have been attracted by the high interest differentials, this imbalance also reflected the continued presence of domestic capital controls (i.e. raising devaluation expectations), and to some degree the lack of FDI opportunities on the highly illiquid

[13] Mexico had a similar experience of financial liberalisation, massive private credit growth and a fall in the savings rate during 1990-93 (e.g. see Edwards, 1997, Calvo and Mendoza, 1996, and Sachs, Tornell, and Velasco, 1996).

stock exchange. A lengthy sterilised intervention with the aim of stabilising the nominal exchange rate and restraining monetary growth under increased flows, therefore, was inevitably doomed to failure.

Towards the end of 1995, interviews have suggested that foreign investors were seriously concerned by the widening current account deficit, rising inflation, the size of domestic public debt and the (albeit modest) real effective appreciation. Thus, if foreign investors were reasonably well-informed, they could rationally have expected a depreciation of the exchange rate in early 1996, through decontrol of domestic capital flows[14]. In the first place, the Reserve Bank's increasing policy trade-off under the large inflows was clearly apparent, as it struggled to prevent appreciation of the nominal rate. At the same time, the accelerating level of gross reserves, if sustained, could feasibly have produced a forecast for a few months hence that was close to the suggested exchange-decontrol "target" for reserves. Moreover, the forward book had been substantially reduced.

"Second generation" models of currency crises suggest that where there are reasonable expectations of future depreciation, rumours can trigger a herd retreat from the currency by forward-looking investors. The so-called "unfounded" rumour of an announcement of domestic exchange decontrol around the time of the Budget (early March, 1996) was in fact quite founded (interviews), though the intended decontrol package was put on hold (until July, 1997) in the event of the currency crisis that began in mid-February[15]. Other rumours and announcements had the expected effect. The rand fell 3.7 percent on 16 February, and 5.4 percent by the end of February (Figure 1). By late April the rand had depreciated by 20 percent compared to its level in mid-February. Greater volatility ensued in much of 1996, and subsequently.

During the currency crisis, the Reserve Bank intervened massively to prevent depreciation of the rand. In the two and a half months from mid-February, about US$1.8 billion in net reserves was lost, a decline of more than 40 percent. During the first two weeks of the crisis alone, spot intervention sales of dollars amounted to US$1,3 billion. However, an even larger intervention took place on the forward market, largely to enable importers to cover future commitments. By the end of April, about US$3.5 billion out of a net total intervention of US$5.3 billion had occurred via the forward market.

An important question to ask is why the Reserve Bank and the South African authorities would be willing to commit such massive resources in a losing battle? Possibly the authorities believed that the episode of reversed capital flows was temporary, driven by rumours such as that President Mandela had fallen ill. The above discussion, however, and the empirical work presented section 3 below, suggests such rumours (unfounded or otherwise) could at most constitute a "trigger", with much deeper "fundamental" causes behind the crisis. It is as if the authorities failed to recognise the makings of a *classic* currency crisis in 1995, where the market will anticipate the implication of a move by the authorities eventually to address the primary policy goal in the dual policy trade-off.

3. Estimating a currency crisis model for South Africa [16]

The model employed below to analyse the rand crash beginning in February, 1996, represents the "second generation" type of model in this literature. The "first generation" or "canonical" model (e.g. Krugman 1979; Flood and Garber 1984) emphasises the role of weak macroeconomic fundamentals in

[14] Survey and other measures of the currency expectations of domestic and foreign investors are compared and contrasted in Aron et al (1999).

[15] It is strange that the Bank proved reluctant to release domestic controls during the crisis (interviews). Partial decontrol (such as was anyway enacted in July, 1997) would likely have enhanced the Bank's credibility, and possibly halted or diminished the rapid outflows. Moreover, there was a built-in disincentive for domestic capital flight, given the depreciation.

[16] Illustrative results are presented here for South Africa: for a more detailed econometric analysis using this type of theoretical model, see Aron et al (1999).

the making of the crisis, where the government's use of a limited stock of reserves to defend a currency peg, while resorting to monetary expansion for financing persistent budget deficits, will eventually be unsustainable. This triggers a speculative attack by forward-looking investors who anticipate the inevitable collapse of the peg regime. The main determinants of a crisis in these models are variables such as the levels of reserves, the stock of money or the fiscal deficit.

By contrast with the somewhat mechanical "canonical" model, the "second generation" model (e.g. Obstfeld 1994, 1996) deals more realistically with the policy trade-off faced by the government. Specifically, the model posits a loss function to guide the decision of the authorities as to whether or not to devalue in response to domestic or external shocks, by making a trade-off between short-run macroeconomic flexibility and longer-term credibility. The logic of crisis then arises from the fact that defending a parity is more expensive (i.e. requires higher interest rates) if the markets believe that the defence will ultimately fail. As a result, a speculative attack on a currency can develop either as a result of a predicted future deterioration in fundamentals, or through the "self-fulfilling" expectations of investors. This class of model has opened up the set of possible determinants of a crisis to include a range of trade-offs affecting the authorities' objective function, where the weights placed on different policies can be made to depend on the "type" of government (for example, whether it is more concerned with high inflation or high unemployment).

Depending on whether the cost of high real interest rates due to maintenance of the peg leads to a higher financing cost for government debt, or a weakened banking system or undermines the competitiveness of the economy, the set of leading indicators of a crisis could include the stock of public debt, the presence of banking problems (e.g. relative price of bank stocks, the proportion of non-performing loans, central bank credit to banks, or a large decline in deposits), and the extent of real exchange rate overvaluation relative to an appropriate equilibrium, in addition to political variables that influence the type of government preferences as perceived by the market.[17]

In what follows, we briefly sketch the main features of a "second generation" currency crisis model due to Agenor and Masson, which we then apply to South Africa in some preliminary regressions on the causes of the currency crisis. Full details of the model can be found in Agenor and Masson (forthcoming).

3.1. The Agenor and Masson credibility model of crises

Agenor and Masson (forthcoming) present a simple version of a "second generation" model without multiple equilibria (see below), but extend the model to incorporate different "types" of government. Two types are identified: governments that put a high weight on maintaining an announced exchange rate path are deemed to be "tough" (T); while those that do not are deemed "weak" (W).

The other agent in the model is the forward-looking, but not full-informed, private sector, whose expectations of devaluation ultimately influence the government's decision about when and whether to devalue. Private investors are uncertain about policy-makers' preferences, and also the size of exogenous shocks that directly or indirectly enter the government's preference function. But they know that random shocks affecting key relevant macroeconomic variables (reserves, in the model below) will alter the balance of costs and benefits associated with parity adjustment relative to maintaining the exchange rate path. Based on lagged observed variables, private agents will re-evaluate the probabilities that a

[17] A recent comprehensive analysis of the empirical literature (Kaminsky et al, 1997), suggests that "an effective warning system should consider a broad variety of indicators: currency crises seem to be usually preceded by multiple economic, and sometimes political, problems." (p. 12). They report a set of variables that are robustly associated with currency crises, including international reserves, the real exchange rate, credit growth, credit to the public sector and domestic inflation. There is also empirical support for an effect from the trade balance, export performance, money growth, M2/international reserves, real GDP growth, and the fiscal deficit.

particular type of government will decide to devalue in the future. The agents will also continuously "update" their assessment about the type of government based on its actions in the previous period (whether it did or did not devalue).

The model emphasises the trade-off between limiting fluctuations in domestic interest rates on the one hand, and maintaining exchange rate stability on the other. Formally, the authorities' one-period loss function, *L*, is given by:

$$L_t = (i_t - \hat{i}_t)^2 + \theta(\Delta e_t), \quad \theta > 0 \qquad (1)$$

where i_t is the interest rate on domestic-currency denominated assets (with $\hat{i}_t$ its desired level) and e_t is the logarithm of the nominal exchange rate (measured in units of domestic currency per unit of foreign currency)[18]. The "reputation" of government enters via the weights θ, which can take on one of two values θ^v and θ^T, for weak and tough governments respectively, with $\theta^T \geq \theta^v$.

The first term captures the costs associated with deviations of the domestic interest rate from its desired level. Such costs might relate to direct output or employment costs of higher interest rates, concerns about domestic government debt, or weaknesses in the domestic banking sector. The second term measures the cost of exchange rate instability which can be related to the cost of higher inflation where the exchange rate operates as an intermediate target, and also to reduced credibility if there has been a strong commitment to a fixed peg.

The building block of this model is a simplified expression for the change in official reserves (ΔR_t), which has a capital account and a current account component. The capital account is somewhat restrictively specified as a flow function, depending on uncovered interest parity. The current account depends on competitiveness, and incorporates sticky prices in the adjustment of the real exchange rate. It is assumed that there is imperfect substitutability between domestic and foreign goods, as well as between domestic and foreign assets.

$$\Delta R_t = + \alpha (i_t - i_t^* - E_{t-1} \Delta e_t) + \gamma(e_t + p_{t-1}^* - p_{t-1}) - \varepsilon_{1t} \qquad (2)$$

where λ, $\gamma > 0$, and p_t and p^*_t are logarithms of domestic and foreign prices, respectively.

The model then specifies money market equilibrium. The interest rate is assumed to be a negative function of the stock of base money, which in turn is assumed to depend positively on the lagged value of the money stock and changes in official reserves.

$$i_t = \delta_0 - \delta m_t \ , \ \delta > 0 \qquad (3)$$

$$m_t = \frac{M_t}{Y_{t-1}} = \mu_o + \mu'_1 m_{t-1} + \mu' \Delta R_t + \varepsilon_{2t} \ , \ O < \mu'_1 < 1 \ , \quad \mu' > 0 \qquad (4)$$

where ε_{2t} is a random term, and ΔR, as well as M, is expressed relative to lagged output[19].

Normalizing constant terms to zero, equations (2), (3) and (4) yield equation (5):

$$i_t = \Omega^{-1}[-\mu_1 m_{t-1} + \alpha\mu(i_t^* + E_{t-1}\Delta e_t) - \gamma \mu (e_t + p_{t-1}^* - p_{t-1}) + \varepsilon_t] \qquad (5)$$

where $\mu_1 = \delta\mu'_1$, $\mu = \delta\mu'$, $\Omega = 1 + \alpha\mu$, and $\varepsilon_t \equiv \mu \varepsilon_{1t} - \delta\varepsilon_{2t}$.

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[18] Note that Δe is either zero or an amount d, which is assumed exogenous. This effectively rules out multiple equilibria - see below.

[19] The plausible assumption here is that there is imperfect sterilisation, since with $\mu' = 0$ in equation (4), there would be no feedback of reserves onto the monetary base.

Equation (5) is the pivotal equation of Agenor and Masson model. A nominal devaluation (which increases e_t) will improve competitiveness and the trade balance, raise official reserves, and thereby lower domestic interest rates. An increase in the foreign interest rate (for given expectations of the rate of depreciation of the exchange rate) has the opposite effect, inducing capital outflows which lower reserves and the money stock, and hence raises domestic interest rates.

There are two exchange rate regimes in this simplified model. Denote L_t^D to be the value of the loss function under devaluation, and denote L_t^F to be the value of the loss function if the exchange rate is kept fixed. The government then devalues when $L_t^D - L_t^F \leq 0$, or where the costs of the fixed regime outweigh those of devaluing.

Considering first the regime without devaluation, then in equation (5), $e_t = e_{t-1}$ (i.e. the nominal rate does not alter), and this gives an expression for i_t^F, the interest rate when there is no devaluation. Substituting for i_t^F in the loss function eq (1) gives L_t^F. On the other hand, if the government devalues, then in equation (5), $e_t = e_{t-1} + d$ (where d is the size of the devaluation), and this gives an expression for i_t^D, the interest rate when there is devaluation. Substituting for i_t^D in the loss function eq (1) gives L_t^D. After some manipulation it can be shown that $L_t^D - L_t^F < 0$ only when

$$\varepsilon_t > \hat{\varepsilon}_t \equiv \mu_1 m_{t-1} + \kappa - \alpha\mu(i_t^* + E_{t-1}\Delta e_t) + \gamma\mu s_{t-1} \qquad (7)$$

where $s_t = e_t + p_t^* - p_t$ is the real exchange rate, and

$$\kappa = \Omega\hat{i} + \mu\gamma d/2 + \theta\Omega^2/2\gamma\mu$$

The condition in equation (7) is the threshold condition for switching between the two exchange rate regimes (devalue, do not devalue). The switch will occur when the shock to reserves, ϵ, is larger than some threshold value, $\hat{\varepsilon}$. This threshold is affected by the state of the macro-fundamentals, the real exchange rate and money supply, and by the foreign interest rate. Moreover, a good reputation will increase the threshold, since as θ can take one of two values: θ^v or θ^T (weak or tough government), $\hat{\varepsilon}$, through κ, will depend on the policymaker's type. On the other hand, private sector expectations of exchange rate changes negatively influence the threshold (make the switch more likely). These expectations depend on the probability that the government is weak or tough, as well as the probability that a given type of government will devalue given a shock to reserves.

It is possible to derive an expression for the private sectors' expectations of exchange rate changes using equation (7), and assuming a particular distribution for the shock to reserves. For a given policy type $h = T,W$, and denoting the probability of devaluation by a government of type h as ρ_t^h, then from equation (7):

$$\rho_t^h = Pr(L_t^D - L_t^F < 0) = Pr(\varepsilon_t > \hat{\varepsilon}_t^h)$$

If the shock to reserves, ε_t, is assumed to follow a uniform distribution in the interval $(-v, v)$, with $2v \geq \alpha\mu d$, then

$$\rho_t^h = (v - \hat{\varepsilon}_t^h)/2v \qquad (8)$$

Denoting the probability of a weak government by π (and of a tough government by $1 - \pi$), the probability of devaluation and the expected devaluation rate are given, respectively, by

$$\rho_t = \pi_t\rho_t^W + (1-\pi_t)\rho_t^T \qquad (9)$$

$$\rho_t d \equiv E_{t-1}\Delta e_t = [\pi_t\rho_t^W + (1-\pi_t)\rho_t^T]\, d \qquad (1) \qquad (10)$$

Using (7) to (10), it is possible to solve for $\rho_t d$, the expected devaluation rate [20] :

$$\rho_t d = \frac{d}{1 - \alpha\mu d/2v}\left[\frac{\pi_t(\kappa^T - \kappa^W)}{2v} + \frac{1}{2v}[v - \kappa^T - \mu_1 m_{t-1} + \alpha\mu i_t^* - \gamma\mu s_{t-1}]\right] \qquad (11)$$

where $\kappa^T - \kappa^W$.

A linearised estimable version of equation (11) is thus given by:

$$E_{t-1}\Delta e_t = a_o + a_1\pi_t + a_2 i_t^* + a_3 s_{t-1} + a_4 m_{t-1} + \mu_t \qquad (12)$$

where a_1 , $a_2 > 0$ and a_3 , $a_4 < 0$ and μ_t is an error term. This equation suggests that given an assessment by the private sector of the probability that the government is weak, i.e. π_t , then the expectation devaluation rate will be raised by a higher value for the foreign interest rate, and lowered by real depreciation or a higher level of the beginning-of-period money stock.

Since private agents are not fully informed in this model, a learning approach has to be specified. It is assumed that they use a Bayesian approach for updating their assessment of the probability of a weak government, π_t. Starting from a prior estimate, π_{t-1}, private agents observe the absence of a devaluation at time t-1, which leads to a Bayesian formula for π_t based on the relative likelihoods that the two types would have chosen not to devalue:

$$\pi_t = \frac{1 - \rho_{t-1}^W}{(1 - \rho_{t-1}^W)\pi_{t-1} + (1 - \rho_{t-1}^T)(1 - \pi_{t-1})}\,\pi_{t-1} \qquad (13)$$

Substitution of (8) for $\rho^W{}_t$ and $\rho^T{}_t$ in (13) and linearising, results in the following equation:

$$\pi_t = b_1\pi_{t-1} + b_2 i_{t-1}^* + b_3 s_{t-2} + b_4 m_{t-2} + B'dummies + \eta_t \qquad (14)$$

where $0 < b_1 < 1$ and $b_2 < 0$ and b_3 , $b_4 > 0$ and η_t is an error term. The B' is a vector of event dummies that may detract from or enhance reputation, and hence affect the probability, π_t, of the government being weak. This updating equation for π_t has the opposite sign for the variables (here lagged) that also appear in equation (12), conditional on no devaluation having occurred. Thus, a government that accepts declining competitiveness without devaluing last period, is perceived as less likely to be weak.

3.2. Estimating the model for South Africa's February, 1996 crisis

In Agenor and Masson (forthcoming), the authors use a Kalman Filter procedure to estimate jointly the "measurement" equation (12) and "state" equation (14). Here we present some preliminary regressions

[20] Note that since the expectations are equal to the product of the probability of devaluation and the size of the devaluation, this would lead to an inherently non-linear function and result in multiple equilibria, unless the size of the devaluation was assumed fixed (as above). Otherwise there could be multiple values of the shock, which if realised, would make it optimal for the government to quit the regime.

for South Africa using the related Cochrane and Orchutt method (Cochrane and Orchutt, 1949)[21]. A more complete analysis for South Africa's crises in 1996-98 can be found in Aron et al (1999).

In order to implement the Cochrane and Orchutt procedure, equations (12) and (14) are transformed into an equivalent form, but where the transformed state equation (14)' contains only a lagged state variable, π, on the right hand side. Equation (14) consists of the unobservables π_{t-1} and η, while the rest are observable variables. Solving equation (14) backwards, in order to extract the systematic part from the error part, we obtain the following expression:

$$\pi_t = b_2 K i^*_{t-1} + b_3 K s_{t-2} + b_4 K m_{t-2} + B' K\, dummies_t + K\eta_t$$

where the Koyck lag transformation, K, is defined by $\boldsymbol{K}\boldsymbol{x}_t = (\boldsymbol{x}_t + \boldsymbol{b}_1\boldsymbol{x}_{t-1} + \boldsymbol{b}_1^2\boldsymbol{x}_{t-2} + \boldsymbol{b}_1^3\boldsymbol{x}_{t-3} + \ldots)$.

Defining π^* as:

$$\pi^*_t = \eta_t + b_1\eta_{t-1} + b_1^2\eta_{t-2} + \ldots = b_1\pi^*_{t-1} + \eta_t$$

and solving, leads to the following pair of equations (12') and (14'), which are exactly equivalent to equations (12) and (14):

$$E_{t-1}\Delta e_t = a_o + a_1 [b_2 K i^*_{t-1} + b_3 K s_{t-2} + b_4 K m_{t-2} + B' K dummies + \pi^*_t] + a_2 i^*_t + a_3 s_{t-1} + a_4 m_{t-1} + \mu_t \qquad (12')$$

$+ \eta_t$

In the Cochrane and Orchutt approximation, equation (12') is estimated with monthly data. The theoretically-expected signs on the Koyck lag terms in equation (12') are identical to those expected in the original state equation (14). We use a grid of values for b_1 ranging from 0.1 through 0.9, and each set of Koyck lags is recomputed for the new value of b_1. The best equations are then selected by the highest likelihood.

The dependent variable, a measure of market currency expectations, is given by the yield differential between a rand-denominated bond and a foreign currency-denominated South African bond of a similar maturity, matching also the times of measurement.[22] Data limitations force the use of the 1991 Deutsche Mark global bond issue of the South African government matched with a rand bond, which suggests the incorporation of inflationary and interest rate expectations over four years (see Aron et al, 1999, for some other alternatives). This horizon compares poorly as a measure of short-term expectations with the Mexican equivalent, the Cetes-Tesebonos differential (28 or 91 day peso- and dollar-priced liabilities) used by Agenor and Masson. Against this, the volatility of foreign holdings of the rand-denominated debt suggests it is best treated for policy purposes as short-term debt (CREFSA Quarterly, January, 1997). The period of estimation begins in the month of the elections, April, 1994, when the exchange rate appeared to begin to follow an implict target (Figure 1), and runs until January, 1996, the month before the depreciation.

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[21] Essentially the Kalman technique can be thought of as a way of handling the moving average (MA) error term from the joint model obtained from equations (12) and (14). The related Cochrane and Orchutt procedure approximates the MA error process by an AR (1) process. It can easily be shown that if b_1 is not too large, these two processes will yield similar results. The Cochrane-Orchutt procedure has the advantage of simplicity in an initial examination of the data.

[22] Note that this separates government default risk from exchange rate risk, which are conflated in a typical measure of country risk, as the differential between South African foreign currency-denominated and foreign country bond yields.

The economic fundamentals called for in equation (12') are disequilibrium measures of the real exchange rate and base money relative to lagged nominal income, and the foreign interest rate. We use the Reserve Bank measure of the real exchange rate (RER) and subtract the mean for the estimation period.[23] Since, in practice, we expect a slower feedback from real exchange rate disequilibrium to the trade balance and reserves than is implied by equation (12) in the theoretical model, we also test a three month moving average of the disequilibrium exchange rate. The second fundamental is captured by M3 relative to lagged nominal income[24], less its mean over the period 1990:1 to 1996:1 (termed money). Alternatively, we also substitute total credit extended by the monetary sector for the money fundamental (termed credit). For each of the variables RER, money and credit, a negative sign is expected (see equation (12). We also include the annual rate of consumer price inflation in some models, Δlog (CPI), to achieve a broader set of influences on devaluation expectations than merely the money stock (a positive sign is expected). For instance, the effect of trades union agreements, and the effect of trade liberalisation, are expected to be important in South Africa in the 1990s.

The foreign interest rates used are the US 3 year bond rate (ius) and the German government bond rate (idm), reported by the IMF, less their means over the period 1990:1 to 1996:1. Given that the dependent variable uses a German interest rate, it is not clear which foreign interest rate is appropriate. Specifically we test a weighted average of these interest rates, ((1-α) ius+α idm), freely estimating the weight α, or restricting one or other interest rate to have a weight of zero (we expect a positive sign for α). For the same reason we also "correct" the dependent variable for these effects.[25]

Two dummies are included to capture events affecting credibility of government and risk. The first is a dummy for the election (Delection), which takes the value of 1 for March and April of 1994, and zero otherwise. This dummy enters as a Koyck lag. The effect of the election was to raise the credibility of the government (i.e. to reduce the probability of weak government), and we therefore expect a negative sign. The second dummy is for the unification of the dual exchange regime (Dunification) which was announced in March, 1995, and enters as a regime shift, being one for the period after the announcement and zero otherwise. Ending the multiple exchange rate system may have raised the credibility of government in the short-term, removing controls on capital outflows for foreigners; but it thereby also raised the risk of devaluation. We therefore expect a positive sign for this dummy. Finally, although we do not expect global contagion to be an important factor in the February, 1996 crisis, we nevertheless test for this using a monthly measure of global risk appetite.

Given the very small sample of monthly data, we imposed an approximate theoretical restriction that the effect of the fundamentals in the theoretical equation (12) are opposite and proportional to the effect of the same fundamentals in equation (14). The Cochrane Orchutt procedure expressed in non-linear form is as follows, and was estimated using non-linear least squares:

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[23] The problem with using the real exchange rate is that the "equilibrium" benchmark is not easily approximated by a mean. In particular, given the large regime shift of a significant resumption of capital flows after the election, "sustainable" flows are not easily judged on *past* behaviour, when flows were for a period negligible for political reasons. That is, given capital controls on domestic residents and trade controls, a real *appreciation* is expected if the increase in net inflows is permanent (see Aron, 1997).

[24] With monthly data, income is proxied by a production index constructed from a share-in-GDP weighted average of mining and manufacturing indices of production multiplied by the CPI, with respective weights of one-third and two-thirds.

[25] The "ideal" dependent variable is [SA rand bond yield - ((1-α) SA US dollar bond yield + α SA deutsche mark bond yield)]. This is equivalent to [(SA rand bond yield - SA deutsche mark bond yield) - (1-α) (SA US dollar bond yield - SA deutsche mark bond yield)]. The first of these terms is the actual dependent variable we use, and the second is the correction term, which we approximate using US and German government bond yields.

$$
\begin{aligned}
dep = {} & \rho\, dep_{t-1} + [a_0\ constant + (1-\alpha)(ius-idm) + a_2\ ((1-\alpha)ius + \alpha\ idm) \\
& + a_3\ RER_{t-1} + a_4\ money_{t-1} + a_5\ \Delta log\ (CPI)_{t-1}] \\
& + \beta\ [a_2(\alpha\ Kidm_{t-1} + (1-\alpha)Kius_{t-1}) + a_3\ KRER_{t-2} + a_4\ Kmoney_{t-2} + a_5\ K\Delta log\ (CPI)_{t-2} \\
& + a_6\ KDelection + a_7\ KDunification] \\
& - \rho\ [a_0\ constant + (1-\alpha)\ (ius_{t-1} - idm_{t-1}) + a_2\ ((1-\alpha)\ iusdis_{t-1} + \alpha\ idmdis_{t-1}) \\
& + a_3\ RER_{t-2} + a_4\ money_{t-2} + a_5\ \Delta log\ (CPI)_{t-2}] \\
& - \rho\beta\ [a_2\ (\alpha\ Kidm_{t-2} + (1-\alpha)\ Kius_{t-2}) + a_3\ KRER_{t-3} + a_4\ Kmoney_{t-3} + a_5\ K\Delta log\ (CPI)_{t-3} \\
& + a_6\ KDelection_{t-1} + a_7\ KDunification_{t-1}];
\end{aligned}
$$

where dep=(SA rand bond yield - SA-issued deutsche mark bond yield); the "K" prefix stands for a Koyck lag; ρ is the first order autocorrelation coefficient (which, as noted above, proxies a possible MA component in the composite error term, $\mu_t + a_1\ \pi^*_t$); β, which should be negative, embodies the restriction that the economic fundamentals enter π in Koyck lagged form with the opposite sign but in proportion to their direct effect; and α is the weight on the German interest rate.

The results are given in Table 2. In general in the context of this policy trade-off model, we find that past economic fundamentals and reputation do appear to have been important determinants of the devaluation expectations of forward-looking private investors in the run-up to the crisis of February, 1996. This contrasts with a view that "unfounded" rumours alone triggered the crisis.

In the first column we report results for Model 1, which uses only the fundamentals of equations (12) and (14) from the theoretical model in section 2.1. From a previous run, where the coefficient on α was freely estimated, we were able to accept the hypothesis that α is 1, giving the full weight to the German interest rate. This is imposed in Model 1, but all other coefficients, including ρ, are freely estimated. Although all the signs are as expected, and in accordance with the restricted model, the model is poorly estimated. The coefficient for β, though the sign is correct, is far too high[26]. The high value of ρ suggests the omission of a positively autocorrelated variable (rather than that the variance of η is high relative to μ, given a composite error term, $\mu_t + a_1\ \pi^*_t$, where $\pi^*_t = K\eta_t$). A likely candidate to affect devaluation expectations is inflation, which is closely watched both by investors and by the Reserve Bank, and is influenced by a range of domestic regime changes such as new labour legislation, and the liberalisation of trade in the 1990s.

We include a measure of inflation in the next two models, Models 2 and 3, and substitute credit for money in the second of these models. The value of the freely-estimated α in each case is close to 1, thus weighting more heavily the German interest rate. In each case, in a prior run, we were able to accept the hypothesis that the value of ρ is zero (point estimates below Table 2), and this is imposed in Models 2 and 3. This suggests the variance of η_t is small relative to that of μ_t, i.e. that the explicitly modelled components of credibility will capture the variation in π_t. Models 2 and 3 are fairly well estimated, and all variables have the expected signs, while the restriction of opposite and proportional signs on the fundamentals is accepted. Given that b_1 is 0.6, and β is estimated as -0.39, the economic fundamentals have long-run effects close to zero. As pointed out earlier, we also tried a moving average of the real exchange rate, which made little difference to the results; while the variable for risk appetite was insignificant, as expected. The DW statistics for Models 2 and 3 are on the high side, suggesting possible overfitting, difficult to avoid in such a short sample. These are fair results given the size of the sample, and also the approximation entailed in the dependent variable, where the maturity of the bonds is longer

[26] Note that the economic fundamentals enter in the form $a_i\ [x_{i,t-1} + \beta K x_{i,t-1}]$. The steady-state values are $x_i\ (1 + \beta/(1-b_1))$. In column 1, b_1 is 0.5, and β is estimated as -0.84, so that the long-run coefficient has the opposite sign of the short-run coefficient (though given the standard error of the estimated β, the hypothesis that the short and long-run effects have the same sign could also be accepted).

than desirable. It is also worth pointing out that in Agenor and Masson (forthcoming), significance was found only for two dummies in equation (14), but none of the fundamentals in equations (12) and (14).

This finding of the relevance of trends in economic fundamentals and the reputation of government in risk assessments by investors has important implications for the next few years. With high rates of unemployment (more than 30 percent), the market is likely to second-guess programmes that commit to avoid short-run macroeconomic populism (such as the GEAR), no matter how well-articulated or thoroughly negotiated by most of the stake-holders in the society. For example, fiscal laxity in 1997 was characterised as having posed a serious threat to the GEAR strategy, "which is already under-performing - to the unconcealed delight of the bizarre left-right alliance that so dislikes it. Not only is GEAR missing its growth and employment targets, but interest rates have had to be kept much higher than intended, and it now looks as if the budget too will overshoot its target." (Economic Intelligence Unit, October 1997: p. 4). Our analysis above clearly exposes the conflicts between short-run and longer-run objectives, and the political economy that underlies this conflict. Moreover, even within the longer-term strategy, there are some perceived conflicts between the export-oriented growth path promised by the GEAR and the currently considered labour bill. For example, it is argued that some terms of this bill (overtime provisions and the extension of permanent workers' rights to "non-standard employees") may endanger the job-creating potential of small to medium-sized enterprises, by significantly increasing corporate costs.

4. Export-led Development Strategy, Exchange Rate and Capital Account Policies

There is little disagreement that the South African economy would not benefit from further import-substitution, beyond the fairly substantial industrial capacity created during the apartheid regime. The real challenge facing the economy is to turn this capacity into a strong base for a more diversified export-led growth. There is, however, some debate about the appropriate approach for supporting an export-orientation drive. From the perspective of the relatively sophisticated formal manufacturing and financial sectors, it appears that priority should be accorded to macroeconomic stability (especially stable exchange rates), to orderly foreign exchange and financial markets and to microeconomic efficiency. These sectors are poised to reap the returns of a sustained growth in productivity, which in turn will lead to secular real currency appreciation (Balassa, 1964; Samuelson, 1964).

However, this enclave should not be looked at in isolation from the rest of the economy. For instance, via labour market linkages, dynamic growth in this enclave may be constrained by South Africa's skills and education deficit. The type of export-led growth envisaged by official government development strategies (e.g. the RDP, and its successor, the GEAR), requires that growth should be adequate and sustained, but also job-creating and widely-shared. For parts of the South African economy, therefore, export competitiveness may require a *strategic* real currency depreciation. However, with global capital market integration, maintaining an orderly depreciation before the economy is sufficiently developed to sustain secular equilibrium real exchange rate appreciation, has proved formidable for many developing countries. Taking cognisance of the importance of private capital flows for financing investment in South Africa, we outline below a policy mix for managing capital flows in a context of an export promotion strategy.

4.1. Medium to Longer Term Fundamentals

Sound Fiscal Policy And Adequate National Savings

A sound fiscal policy is of central importance for policy credibility in the medium-term, especially to target successfully an "appropriate" real exchange rate (e.g. see Aron et al, 1997). Part of Chile's success in moderating its vulnerability to large inflows has been due to running a modest fiscal surplus (see Le

Fort and Budnevich,1997), but also to a flexible fiscal policy where excess revenues in times of inflows (and higher aggregate expenditure) have been saved to cover periods of outflows.

When the capital account is opened rapidly (and we discuss the potential advantages of a more gradual liberalisation - particularly of inflows - below), the influence of monetary policy in controlling aggregate demand is eroded at the same time that capital inflows and currency appreciation promote the extension of credit and spending. Higher interest rates may constrain inflation at the expense of output growth, but in the short-term the current account deficit will continue to widen.

In theory, a contractionary fiscal policy could reduce the external deficit, especially if the inflows were financing government consumption. However, typically fiscal spending is a small proportion of total expenditure. Moreover, while a strengthening of fiscal policy is desirable, it remains a very cumbersome instrument for the short-run control of aggregate demand in response to volatile flows. Fiscal policy, especially in developing countries, is constrained by demanding institutional requirements for tax improvements, by the possible requirements of legislative approval to alter spending, and in some cases, by political considerations. An improvement in the fiscal position could also have the perverse effect of encouraging further inflows in the short-run.

South Africa has recently taken a medium-term view of fiscal policy. From 1998, the budget has for the first time been set within a three-year Medium-term Expenditure Framework, in order to improve management, planning and credibility of fiscal targets. The GEAR macroeconomic strategy of June, 1996 also announced a progressive reduction in the fiscal deficit from 6.1 percent of GDP in 1995/96 to a targeted 3 percent by the year 2000. This document signalled for the first time the coherent macroeconomic policy intentions of the new government, and was an important, though belated, factor in calming the turbulent foreign exchange markets in 1996. By 1997/98 the deficit of 4.4 percent lay close to the targeted 4 percent of GDP; but maintaining the targets may be hampered by persistent low real GDP growth.

A serious concern in South Africa is to improve government saving. The persistent net *dissaving* by government in the 1990s worsened in 1997 and 1998, due largely to the effect of higher interest rates on a large domestic government debt (55.8 percent of GDP at the end of 1996/97). Together with virtually stagnant net household saving and falling corporate saving in 1998, the net national saving rate has declined below 14 percent of GDP.[27]

To emphasise the importance of strong national saving - even in this era of investible foreign savings in the form of private capital flows - Williamson (1997) makes the following argument, drawing on international evidence from a large set of developing countries. A 6 percent real growth rate would require an investment rate of about 28 percent of GDP; while more than 5 percent of GDP external private debt usually violates the principle of current account sustainability (see also Edwards, 1997). Both considerations would therefore suggest a minimum of a 23 percent of GDP national saving rate for the achievement of desired long-term growth without risking a destabilising currency and perhaps financial crisis - which could substantially undermine the growth objective. Long-term policies and institutions to enhance domestic saving are now emerging as a key prerequisite for reducing the likelihood of financial crises and ensuring that - in an era of integrated capital markets and private capital flows - the real exchange rate remains competitive in the long-run (Williamson, 1997).

Tightening of fiscal policy as a response to capital flows (as recently in the Republic of Korea) would help accommodate the fiscal impact, while higher national saving could allow the Bank to reduce interest rates, as the country's borrowing requirements from abroad decline. An important implication of a low interest rate policy is that it could bias capital flows more into equity finance, and therefore lead to deeper stock market capitalisation. A key deficiency of the current of mode foreign private capital finance in emerging markets (like South Africa) is that it is too much driven by high real interest rates, and is biased toward more volatile money markets.

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[27] For further discussion and a recent analysis of saving in South Africa, see Aron and Muellbauer (1999) and Tsikata (1998).

Other Medium- to Long-term Policies

Disequilibrium effects on the real exchange rate can be induced by "unsustainable" capital flows, spurts of development aid or temporary terms of trade shocks. An analysis of the determinants of the long-run path of the real exchange rate suggests that in addition to fiscal adjustment (especially the reduction of government consumption), deeper trade reforms to increase the openness of the economy, and, to a lesser degree, the accumulation of reserves, are the most effective medium-term measures for limiting such effects (Elbadawi, 1998). While South Africa has substantially opened up its economy (see Aron et al, 1997), and has systematically started to address medium-term fiscal issues, it has not been successful in maintaining adequate reserves in the longer run. A greater resort to credit lines to supplement reserves might be expected in the future, perhaps in the context of an improved medium-term debt strategy (see below). The drastic depletion of reserves through spot intervention, and indeed the fiscal costs of forward intervention, in the largely vain attempts to stabilise the volatile exchange rate in recent years, could in future be mitigated by the set of medium-term and short-term policies outlined here.

Finally, as the recent Asian currency and financial crises make clear, adequate national saving is only a necessary but by no means a sufficient condition for not exceeding the "boundary condition" for private debt finance of 5 percent of GDP. Many of the Asian economies which recently experienced financial crises had fiscal surpluses and strong national saving rates (much higher than the "Williamson saving threshold"). Yet during the period leading to the crisis, dependence on private debt finance, especially short-term debt, soared to double digit levels in several Asian countries. Poor regulation of financial intermediaries and implicit or explicit government guarantees of the liabilities of the financial sector can generate moral hazard, which can induce excessive credit expansion and the accumulation of risky assets, as well as *over*-investment (e.g. see Krugman, 1998).

South Africa has a framework for the regulation of banking institutions, and is currently examining the regulation of non-bank financial institutions. Yet, the enormous expansion in private credit in 1994-97 points to the relevance of supply-side bank credit extension factors, in addition to the oft-cited changing demand patterns after the elections. Information on the regulation and changing risk position of non-bank financial sector in recent years is more difficult to come by.

4.2. Short to Medium-run Measures

Clearly there are limitations to the flexible use of fiscal policy in the short-run to offset changes in aggregate demand from a change in capital inflows. An alternative policy is to sterilise the monetary impact of inflows through the sale of domestic debt, but this is limited to the case of strictly temporary changes in capital flows (see section 2). For persistent inflows, sterilisation can prove prohibitively expensive, apart from the fact that it will eventually raise interest rates and may promote larger speculative inflows.

Another alternative to reduce the real effects of short-term asset market volatility is to control capital inflows. Since the Asian crisis such policies have been looked upon with increasing favour (e.g. Stiglitz, Financial Times, March 25, 1998). While there are clear advantages to an open capital account (including portfolio diversification and an efficient and deeper domestic financial services sector), small, open economies without the appropriate institutions and macro-fundamentals in place can suffer damaging volatility from massive capital inflows and their potential reversal.

Chile has been an advocate of the gradual opening of the capital account (see Massad, 1998), and importantly, by contrast with South Africa, has placed more emphasis on the flexible regulation of inflows than outflows. In Chile, outflows were fairly rapidly decontrolled, in large part to reduce the pressures of large inflows during 1990-95. The only significant remaining control over outflows is a one-year minimum waiting period before repatriation of foreign direct and portfolio investments is allowed (see below). There are also regulations affecting the asset and liability positions of banks and non-bank

financial institutions. However, these are not regarded as capital controls, but rather as prudential regulations to restrict the currency, interest and maturity risks to which such institutions are exposed. Further, only companies meeting a strict risk classification may issue bonds abroad, and these bonds have to have an average minimum maturity of four years. Massad argues that there may be strong benefits for emerging and developing countries in placing prudential restrictions in addition on *non-financial* companies, to reduce the potential systemic risk of excessive foreign currency exposure.

The dangers of implicit or explicit guarantees by governments of the liabilities of their financial sectors are by now very well-known (e.g. Krugman, 1998). However, in practice there is also an *implicit* guarantee of the foreign currency value of short-term assets denominated in local currency (Massad, 1998). This is because central banks in countries where foreign trade is a large component of GDP will tend to emphasise exchange rate stability, and defend the currency try to prevent the inflationary and other consequences of large depreciations. This type of insurance protects international speculators for as long as sufficient reserves remain to defend the currency.

To influence the size, and especially the composition, of capital inflows, *indirect* controls through selective reserve requirements have also been deployed in Chile. The requirement takes the form of a mandatory, non-remunerated deposit with the central bank, for a given period, and a given proportion of flows, on all non-trade related, non-FDI gross capital inflows. The reserve requirement was reduced from 30 to 10 percent in June, 1998, with the mandatory period remaining one year. The Chilean view is that such capital inflow regulation continues to be important where there is a large divergence between domestic and foreign interest rates, and hence the risk of large, volatile speculative flows (Massad, 1998). The point is to reduce speculative inflows and debt by imposing a cost of entry; to reduce arbitrage flows by reducing the differential between external and domestic short-term interest rates, and thus give more autonomy to monetary policy; and to reduce the potential short-term illiquidity of banks by forcing them to keep part of their foreign currency deposits with the Central Bank.

Clearly monitoring such regulations carries costs. Currently around 60 percent of inflows are free of the reserve requirement, some of which is due to evasion of the controls. However, the overall view is that such controls continue to be effective, and have had positive benefits for the economy, complementing sound and flexible monetary, fiscal and exchange rate policies (see also Le Fort and Budnevich, 1997, on the advantages for prudential regulation). The main findings of empirical studies conducted by the Bank of Chile (see Massad, 1998 for references) are that: reserve requirements have not much affected the real exchange rate (quantitatively or statistically), nor the total amount of flows; that there is a moderate positive effect on domestic interest rates (i.e. interest rates can be higher than without the requirement); there is a significant and large effect on the composition of inflows, away from short-term, portfolio and credit flows and toward long-term and FDI flows; and there is a significant and negative effect on the variability of the exchange rate. Note that to the extent that there are higher real interest rates, small to medium-sized enterprises may be more affected, since larger enterprises are likely to have more access to flows exempted from reserve requirements (such as FDI).

4.3. Dornbusch/Tobin Cross-Border Transactions Tax

While in many countries the belief is that capital controls are essentially ineffective through evasion, it is generally accepted that at least for the biggest players in South Africa (e.g. Mutual Funds) such controls on outflows have in the past been binding. However, in addition to their administrative costs and allocative inefficiency, direct controls can lead to non-transparent executive discretion. Similarly, a drawback of the Chilean selective reserves requirements on short-term capital inflows (discussed above as a transitional measure in gradually opening the capital account) is that investors initially were partially able to circumvent requirements. In response, the authorities were obliged to expand the range of transactions to cover virtually all potentially speculative transactions (Massad, 1998).

A proposal of levying a "Tobin tax" on international transactions has recently been actively discussed in the literature (Dornbusch, 1997; Obstfeld, 1995). As pointed out by Helleiner (1997) , some developing countries have already been using this tax to influence the composition and size of flows (e.g.

Brasil since 1994). Obstfeld (1995: p. 188) has also emphasised the relevance of this tax for under-developed financial markets: "A coherent case can be made for a Tobin tax in the context of stabilising developing countries, which need to manage exchange rates and have relatively shallow financial markets, and where the cost of failed stabilisation is extremely high."

More recently, Dornbusch (1997) has argued that this tax should be generalised to cover all international transactions, to avoid the problems of ineffectiveness when the tax is levied only on spot financial transactions. He provides a concrete proposal for the G24 project (see Helleiner, 1997), which may have relevance for South Africa: a small tax would be imposed on *all* transactions in foreign exchange, whether for trade in goods or services or international capital movements; the tax could be varied over time according to changing conditions; and even though the tax is mainly aimed at stabilising the external sector, it could generate sufficient resources at least to finance its administrative costs. However, by no means are all observers sanguine about the effects of such a tax. Problems include the difficulties of multi-country coverage and co-operation; the involvement of futures, swap, options and derivative trades; and the possible undesirable changes to the competitive structure of foreign exchange markets (for further discussion see Haq et al,1996, especially the chapter by Frankel).

4.4. Diversifying the Debt Portfolio: Should South Africa Borrow from the World Bank?

Middle-income countries have increasingly resorted to the private capital market as an alternative source of finance to conditional lending from the multilateral agencies. For instance, according to a recent World Bank policy review of activities, the IBRD was lending at only 55 percent of its capacity prior to the expansion of its lending in response to the crisis in East Asia ("Strategic Compact", 13 March 1997). Notwithstanding this trend, it might be argued that as a transitional strategy, South Africa could stand to benefit by borrowing longer-term from the World Bank.

Long-term finance from the World Bank could serve the following purposes for South Africa. It could smooth the fiscal adjustment toward a stronger fiscal regime in the medium-term (two to three years), before the economy could generate a fiscal position consistent with longer-term private capital market borrowing. Given the urgent need for substantial public sector outlays to finance investment in the social sectors, World Bank finance would make it possible for the country to limit its dependence on private capital market debt, as well as allow the Reserve Bank possibly to adopt selective measures toward private capital flows. Being less responsive to "news" and short-run fluctuation of policies, World Bank long-term finance could act as a "shock absorber" for financial markets, especially since there is substantial fungibility across virtually all forms of private capital flows (Helleiner, 1997).

Yet for South Africa, avoiding World Bank conditionality is what makes private capital market lending particularly attractive, given the political sensitivity of this issue. In the absence of reform to the current World Bank regime of policy conditionality to other forms more acceptable to middle income countries such as South Africa, domestic political considerations may continue to override economic rationale.

5. Some Lessons for Africa from South Africa and Other Emerging Markets

Given the potential importance of private capital flows as a source of development finance, insulating the real exchange rate through elaborate capital account controls (Zimbabwe), or by running an incredible macroeconomic regime (Cote d'Ivoire), is clearly not optimal for long-term development. By building on measures for further debt relief, reform of the current aid regime and further enhancement of the economic and political environments, Africa should be able to tap much higher levels of private capital flows for financing economic and social development. Sub-Saharan Africa is characterised by capital-scarce economies, and therefore potentially high rates of returns to capital. Lifting the debt burden and consolidation of economic reforms and political stability should also help to address Africa's

lingering poor reputation of policy reversals and political instability which has long damaged the volume and composition of private capital flows into Africa (e.g Collier, 1996).

Moreover, there was a substantial exodus of capital from Africa during the 1970s and 80s, despite its relatively low capital per worker, and Africa could exploit globalisation of capital markets at least to repatriate its lost capital. According to estimates by Collier and Gunning (1997), the ratio of capital flight to wealth during between 1970 and 1992 was 0.37 - compared with ratios of 0.29 for the Middle East, 0.17 for Latin America, 0.04 for South Asia and 0.03 for East Asia. This contrasts sharply with the average capital per worker in Africa, at only US$1,560, compared with the other regions (US$10,844 for the Middle East, US$9,157 for South Asia and US$13,018 for East Asia).

Therefore, securing the competitiveness of the economy should not be at the expense of adequate integration into global capital markets. However, as the recent experience of South Africa makes clear, fully liberalising the capital account to inflows can rapidly expose the real economy to massive volatility, even with its relatively austere macroeconomic policies and deeper and more sophisticated financial markets. Moreover, private capital flows can lead to real exchange rate overvaluation, and therefore a derailment off the path toward dynamic export-lead growth. Africa should not allow itself to lose basic macroeconomic competitiveness when other institutional and technological capabilities are not yet in place. Therefore the main aim of macroeconomic policy in this era of globalisation and financial market integration should be to enhance real exchange rate competitiveness.

In this regard, the experience of Chile which combined central bank independence with tight macroeconomic rules, provides some relevant lessons. The Central Bank of Chile, responsible for exchange rate policy, has an explicit target for the current account: on average over the medium-term the current account should be in deficit by between 3 percent and 4 percent of GDP. A flexible target has been used for the exchange rate regime with an appropriate band width, not too tight so as to avoid speculative runs, nor too loose so as to avoid major real exchange rate disequilibria. This institutional macroeconomic design has served Chile well, in that it has allowed the country to maintain a competitive real exchange rate to support rapid growth and diversification of exports, and to mitigate the effects of major financial crises.

The Chilean Central Bank has also been very effective in deploying indirect measures such as reserve requirements against foreign deposits or taxes on foreigners' interest earnings (see also Dornbusch, 1997). However, when formal financial institutions are rudimentary and few, there can be considerable macroeconomic policy mileage in the deployment of some direct controls as well. The efficacy of alternative instruments of control over unwelcome surges of capital, in or out, needs to be studied in the context of specific African situations. Thus, Helleiner (1995: p. 20) argues that, "advice to open up the capital account, such as often flows from the IMF, needs to be carefully weighed against the counter-arguments. Marrying a very thin, immature and therefore volatile set of domestic financial markets to the notoriously volatile (and huge) global financial and exchange rate system may be foolhardy." Policies should be tailored to the specifics of local conditions, as a comparison of recent Ugandan and Zambian policy reforms shows. Exchange controls were previously so ineffective in Uganda that their complete liberalisation probably had very little practical effect. However, they were still to a degree binding in Zambia during 1992-93, so that liberalisation permitted significant substitution out of the local currency and large seigniorage losses for an already fiscally-stressed Zambian government (Adam, 1995). Thus, there are powerful arguments for the use of capital controls, direct or indirect, or both, over both inflows and outflows, as part of the armoury of African macroeconomic and development policy instruments. At the least, such controls can "buy time" for the deployment of more fundamental policy.

In sum, while a transition from total dependence on overseas development aid to a mixed menu of aid and private capital flows represents a challenge, but also an immense opportunity for Africa, the attempt by Africa to increase its share of investment from international private capital markets should be firmly anchored to the basic tenets of an export-based development strategy (Elbadawi and Helleiner, 1998).

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Table 1. -- Selected Macro-Economic Data for South Africa 1990-98

DATE	M2/Gross Reserves	Priv. Credit/ GDP (% change)	CPI Inflation (%)	Bank Rate (%)	Real GDP Growth (%)	Fiscal deficit/ GDP (%)	Gross Dom. Saving/GDP (%)	Current Acc. Deficit/GDP (%)	Terms of Trade (90=100)	London Gold Price ($ per oz.)	LT Capital Flow/ GDP (%)	ST Capital Flow/ GDP (%)	Real effective depreciation (%)	Nominal effective depreciation (%)	Gov. domestic debt/GDP (%)	External Debt/ GDP (%)
	18.48		14.4	18	-0.3	-1.9	19.5	1.9	100	383.58	-0.04	-0.60	4.8	-3.2	32.33	24.5
1990																
1991	15.85	1.90	15.3	17	-1	-2.7	18.9	2	98.4	362.19	-0.56	-0.14	3	-6	36.27	**22.2**
1992	15.36	-1.35	13.9	14	-2.2	-4.5	17	1.5	97.1	343.72	-0.44	-0.94	1.8	-4.8	39.86	**22.3**
1993	16.19	-1.91	9.7	12	1.3	-8.5	17.2	1.6	98	359.7	-0.07	-3.92	-4.4	-9.2	44.90	**23.1**
1994:1	18.67	-3.53	9	12	-2.9	-7.5	17.5	0.8	103.4	384.3	-1.05	-0.30	0.4	-1.1	45.23	
1994:2	20.38	-2.61	7.9	12	2.5	-10	17.4	0.6	102.4	381.5	-1.24	-0.98	-4.31	-6.3	47.11	
1994:3	18.68	2.49	14.3	13	4.2	-4.5	16.6	-1.1	101	385.8	1.08	3.74	0.97	-2.2	46.62	
1994:4	15.30	3.54	8.5	13	6.5	-2.1	17.1	-1.3	100.7	384.6	4.04	-0.94	1.35	1.3	48.00	**24.4**
1995:1	13.41	0.08	9.7	14	2.1	-6.6	16.8	-2.6	100.8	379.2	0.87	4.42	-0.13	-1.7	47.05	
1995:2	14.94	0.29	9.7	15	2.4	-10.6	15.9	-2.8	101.1	388	3.85	0.15	-2.6	-4.5	49.07	
1995:3	15.13	0.75	2.2	15	2.8	-4.4	17.5	-1.4	99.1	384.2	2.36	-0.37	3.02	2.1	49.58	
1995:4	13.51	4.58	5.2	15	2.6	-2.1	17.5	-1.7	100.8	385.3	5.18	-0.50	1.9	0.6	49.98	**26.4**
1996:1	14.62	0.82	9.1	15	3.6	-7.5	17.1	-1	102.6	400.1	3.89	-4.85	-1.2	-1.8	50.26	
1996:2	16.34	-1.04	7.6	16	4.1	-8.6	16.8	-2.4	104.5	390	1.69	-0.81	-10.5	-12.0	50.27	
1996:3	19.58	1.20	8.9	16	3.2	-4.6	17.2	-0.9	103.1	384.7	0.11	-0.95	-1.9	-4.3	50.52	
1996:4	16.92	2.66	11.6	17	2.8	-2.6	16.5	-1.1	101.4	376	-0.42	3.10	-2.2	-4.0	50.90	**27.3**
1997:1	15.44	1.95	9.9	17	-0.3	-6.8	15.8	-1.2	100.8	351.2	3.02	-0.31	**6.7**	5.0	51.16	
1997:2	9.89	0.22	7	17	2.7	-9.3	15.6	-0.9	102.7	343	10.24	-1.30	2.7	1.1	51.72	
1997:3	9.49	-0.07	6.6	17	0.3	-5.0	14.7	-1.5	101.2	323.5	5.51	-4.48	-2.6	-3.0	51.55	
1997:4	9.23	2.49	4.1	16	0.3	**-0.1**	14.5	-2.3	101.4	**306.67**	1.62	-0.43	**-3.2**	-3.8	51.99	**30.4**

SOURCE: South African Reserve Bank, IMF (IFS)
NOTES:
1. Inflation is measured as the percentage change in the CPI (quarterly, compared with preceding period), at seasonally adjusted annualised rates.
2. The real and nominal effective exchange rate indices are as defined by the SA Reserve Bank.
3. The saving ratio is at seasonally adjusted annualised rates.
4. The terms of trade index includes gold.
5. The definitions of short and long-term flows are from the SA Reserve Bank.

Table 2. -- Estimation Results

Variables		***Models***		
		1	***2***	***3***
	ρ	0.73 (6.10)	0*	0*
	β	-0.84 (-1.37)	-0.39 (-9.17)	-0.39 (-8.90)
	α	1*	0.91 (4.81)	0.89 (4.92)
constant	a_0	0.08 (9.51)	0.07 (20.29)	0.073 (19.87)
(1-α)ius+αidm	a_2	0.37 (0.56)	1.17 (2.01)	1.26 (2.17)
RER	a_3	-0.10 (-1.36)	-0.13 (-3.31)	-0.13 (-3.28)
money	a_4	-0.04 (-1.10)	-0.08 (-1.90)	-
credit	a_4	-	-	-0.07 (-1.73)
Δlog(CPI)	a_5	-	0.41 (4.29)	0.42 (4.25)
Delection	a_6	-0.01 (-2.02)	-0.03 (-8.62)	-0.03 (-6.78)
Dunification	a_7	0.01 (1.39)	0.01 (6.08)	0.014 (6.05)
Diagnostics		*(t ratios in parenthesis)*		
Log of Likelihood Function		91.28	100.21	99.8
b_1		0.5	0.6	0.6
Std. error		0.00478	0.00331	0.00337
R-squared		0.97	0.99	0.98
Adj. R-squared		0.95	0.98	0.98
LM het. test		0.29 [0.592]	3.29 [0.070]	5.13 [0.023]
Durbin-Watson		2.14 [0.026,0.998]	2.53 [0.099,1.00]	2.67 [0.196,1.00]

Notes:

1. The dependent variable is expected depreciation, measured by the yield differential between approximately equivalent maturity SA rand and SA-issued deutsche mark bonds.
2. Parameters correspond to the empirical specification in section 3.2.
3. * refers to restricted parameters. Note that when freely estimated in Models 2 and 3, we can accept the hypothesis that ρ is zero (point estimates are, respectively, 0.05 (0.19) and 0.04 (0.14)).
4. Interest rates (in annual terms) for the US dollar 3 year bond and the deutsche mark bond are from the IMF. Both money (M3) and (total) credit are from the SA Reserve Bank (SARB) and are divided by lagged nominal income (see section 3.2). We use the SARB measure of the real exchange rate, RER, redefined so that an increase represents depreciation. The rate of inflation (in annual terms) is given by Δlog(CPI), using the CPI from the SARB. The dummies, Delection and Dunification, and ρ, β and α, are as defined in section 3.2.

Figure 1. -- The monthly bilateral rand/dollar exchange rate

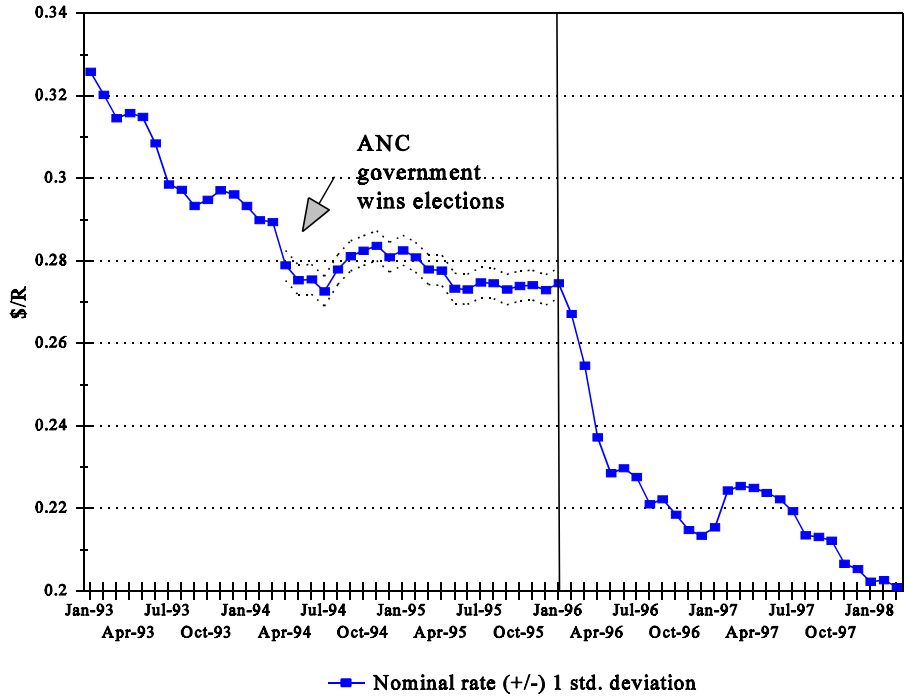

Figure 2. -- Pre-announced money supply targets and outcomes

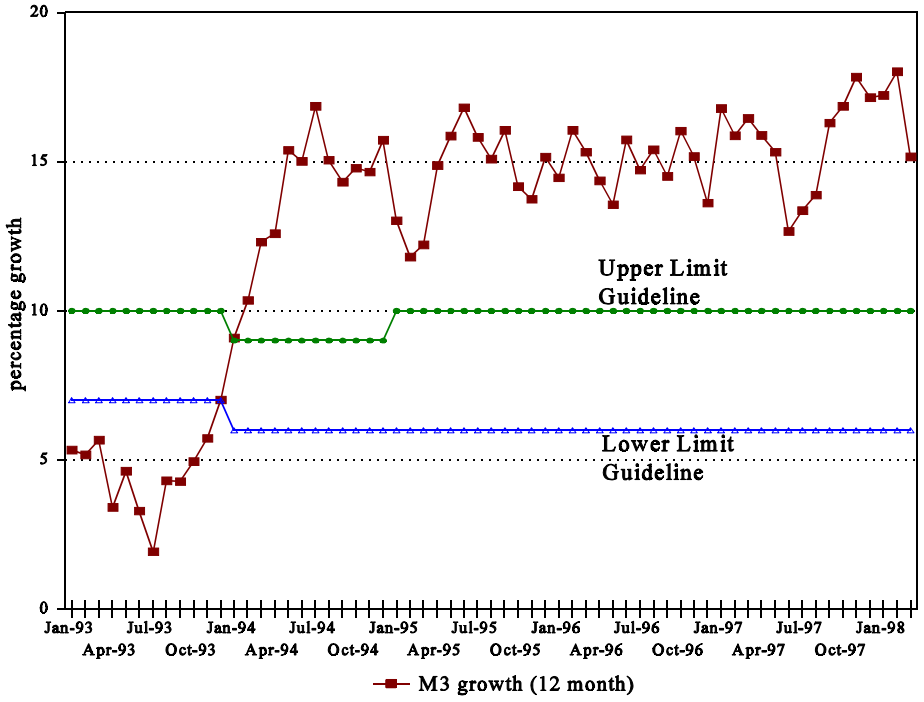

Figure 3. -- Gross and net foreign exchange reserves

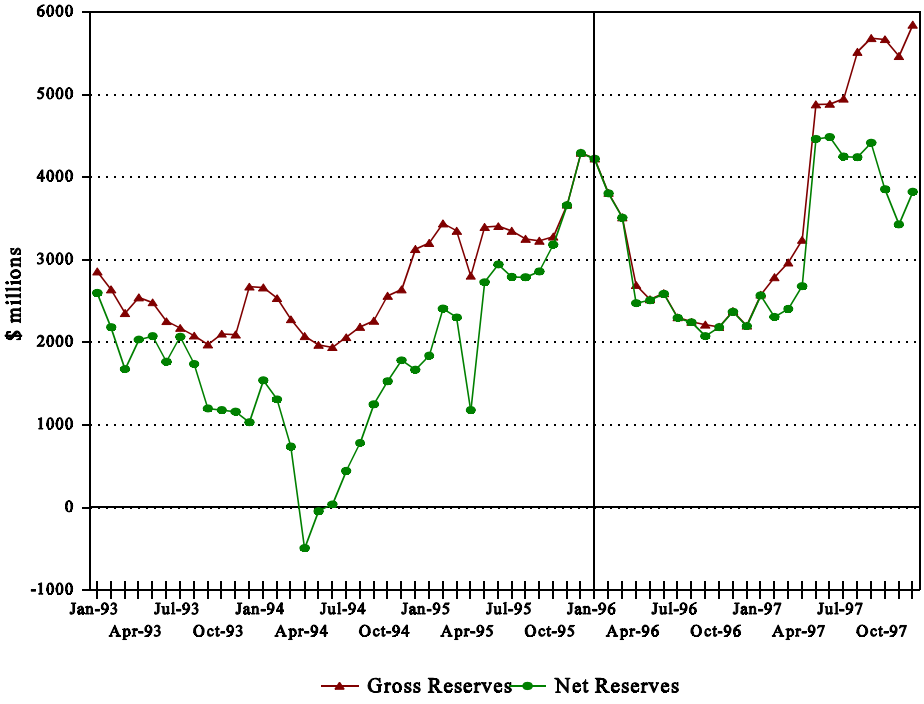

Figure 4. -- Interest rate differential