Current Account Sustainability: Evidence from South Africa

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by

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If circumstances lead me, I will find
Where truth is hid, though it were hid indeed
Within the centre

Hamlet (II. ii. 155-7)

For Deacon

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Abstract

This paper investigates a set of "leading indicators" behind large and persistent reductions ('reversals') in South Africa's current account. It begins by providing a theoretical analysis of current account sustainability based on the intertemporal optimisation of consumption, saving and investment decisions. Drawing on these theoretical concepts, a non-structural approach is then adopted in considering a broad range of indicators that are instructive in evaluating the sustainability of current account deficits. In particular, a country's macroeconomic structure and policy, its external position, and other factors such as expectations, socio-political stability and credibility, are identified as important.

Based on event study methodology (Eichengreen *et al.*, 1995) and work by Milesi-Ferretti and Razin (1997, 1998), a multivariate probit model for South Africa's current account 'reversals' is estimated. Using quarterly data from 1965 to 1996, a binary dependent variable is constructed and used to analyse the impact of various theoretically important variables. The results show that South Africa's current account reversals have been influenced mainly by changes in the country's external macroeconomic environment. These include increases in the OECD economic growth rate, improvements in the country's terms of trade (especially through rises in the dollar gold price), and increasing levels of foreign debt. Reversal periods are typically also associated with rising levels of exports and falling levels of imports. While developments on the capital account were expected, *prime facie*, to have had a significant impact on the current account, this is not borne out well in the regression results. FDI flows, however, are found to be a statistically significant indicator of current account reversals over the sample period.

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CHAPTER 1

Introduction

The series of balance of payments crises that swept international financial markets during the 1990s forced many developing, emerging and transitional (DET) economies to rethink their external positions. The European Monetary System (EMS) crisis in 1992-1993, the collapse of the Mexican peso with its induced "tequila" effects, and most recently the East Asian financial crisis in mid-1997 have had profound effects on world markets and also many countries' current accounts. With the exception of the EMS experience, these events show that large and persistent current account deficits can create a fertile environment for external crises, especially when those deficits are financed through short-term capital inflows.

While the recent East Asian crisis has adversely affected the DET economies to varying degrees, periods of external crises are typically associated with increased exchange market and interest rate volatility, lower asset prices, further declining stocks of foreign reserves, and in many cases, sharp reductions in current account deficits. It is in these immediate post-crisis periods that punitive reductions in both domestic consumption and national output can occur, with associated increases in both unemployment and general socio-political instability. In lieu of the severity of the economic and social costs involved, what lessons can South Africa learn from these recent episodes of external instability?

This paper provides an analysis of current account sustainability and the factors that can threaten the maintenance of an external position. Chapter 2 begins by introducing certain measures with which to gauge current account sustainability. It provides a theoretical framework within which to analyse the dynamics of the current account by focusing on intertemporal optimisation and also on the differing effects of changes in various macroeconomic variables. Building on chapter 2, chapter 3 adopts a non-structural approach to determining and understanding indicators of current account sustainability. It considers several potential indicators that can be helpful in evaluating the sustainability of current account deficits. In particular, an economy's macroeconomic structure and policy, its external position, and other factors are identified as important. Drawing on recent work by Milesi-Ferretti and Razin (1997, 1998), chapter 4 then uses a multivariate probit model to examine

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whether a set of macroeconomic, financial and structural variables can help predict sharp reductions ('reversals') in South Africa's current account between 1965 and 1996. The results indicate that these 'reversals' have been largely influenced by external factors such as changes in the terms of trade – especially with respect to the gold price; growth in the industrialised countries; and rising levels of foreign debt. The country's openness to international trade has also played highly significant role in these 'reversals'. A range of domestic macroeconomic variables, however, was not found to be statistically significant. While domestic events such as the country's turbulent socio-political history may be expected to have played a significant role in these 'reversals' through their impact on the capital account, this is not borne out well in the regression results. Chapter 5 provides an insight into the sustainability of future imbalances on South Africa's current account. It highlights the significance of recent developments in the country's macroeconomic and socio-political environment on the balance of payments. Chapter 6 concludes.

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CHAPTER 2

Understanding Current Account Sustainability

Private agents and policymakers often view persistently large current account deficits as an indicator of future borrowing and balance of payments problems. However, empirical evidence shows that some countries have been able to run considerable current account deficits for a number of years without any notable or significant negative repercussions. Norway during the 1970s, for example, ran extraordinarily high current account deficits relative to OECD standards.[1] Despite this international capital markets remained open without an increase in relative interest rates and without any sharp depreciation of the krona. Both Australia and Canada have also been able to run persistent and, at times, immense current account deficits over the past four decades.[2] However, the current account imbalances that various East Asian economies ran until fairly recently were shown to be unsustainable *ex post*. While an optimal current account deficit cannot be stipulated in a normative sense, there are indicators of potential difficulties. Clearly, when private agents and international financial markets become uneasy about a country's external position, policy makers cannot afford to ignore the situation. The problem then is to determine when concerns about these external imbalances become a binding constraint on future lending.

The following sections introduce the intertemporal approach to the current account. It models consumption (saving) and investment in ways that focus on the intertemporal optimisation and the differing effects of various shocks. The theoretical literature on the intertemporal approach is divided into two categories – the perfect foresight or deterministic models; and the stochastic or present value models. Section 2.1 makes use of the perfect foresight approach in which key elements influencing the savings-investment balances in the world economy are used. It uses deterministic structural equations which model: consumption, investment, growth paths, and interest rates; productivity and output fluctuations; and the effects of demographics, changes in the relative price of tradables versus non-tradables, and

[1] In 1977 Norway's current account deficit stood at 13% of GDP (Sachs, 1981), compared with the total OECD average deficit of 0,4% of GDP for that year (OECD Economic Outlook, Table R21, 1990).
[2] Between 1950 and 1994, Australia's current account was in deficit in all but four years, while Canada's was in deficit in all but five. More recently, Australia's trade deficit widened to a "record" level of more than A$1,5bn in February 1999 with a current account deficit of 5,5% of GDP for the year expected (*Business Day,* 31 March 1999).

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fiscal policy on the current account.[3] Although these models assume agents have perfect foresight and complete information in which uncertainty is of secondary importance, they do allow for an understanding of the intertemporal dynamics of agents' savings and investment decisions. The stochastic approach is developed in section 2.2 of this chapter.

2.1 The Deterministic Current Account Model

Beginning with the national accounting identity, the current account balance can be shown to represent the change in a country's foreign assets. If B_{t+1} represents the value of the country's net foreign assets at the end of period t, the current account balance, CA, over period t can be defined as:

$$CA_t \equiv B_{t+1} - B_t = Y_t + r_t B_t - C_t - G_t - I_t \tag{2.1}$$

where $r^*_t B_t$ is the interest earned on foreign assets acquired previously.

Since savings is given by $S_t \equiv Y_t + r_t B_t - C_t - G_t$, (2.1) can easily be manipulated to yield the fundamental current account identity,

$$CA_t = S_t - I_t \tag{2.2}$$

where S_t includes both private and public saving. Equation (2.2) shows that the current account is fundamentally an intertemporal phenomenon. As simple as it is, (2.2) is vital for analysing how economic policies and disturbances affect the current account.

In order to evaluate the *stable* long-run trajectory of a country's current account, two inter-related questions need to be addressed (Milesi-Ferretti and Razin, 1996a,b). Firstly, is the debtor country *solvent*? Secondly, is the current account deficit *sustainable*?

[3] See Obstfeld and Rogoff (1995: Chapter 2) and Razin (1995:171-177) for example.

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2.1.1 Solvency

Since the surplus or deficit on the current account represents the change in a country's net foreign assets, one approach to judging whether an external balance will become a problem is to assess the country's external debt situation. This approach, which evaluates the notion of intertemporal solvency, investigates the country's ability to repay its external debt. The basic solvency requirement can be expressed by iterating forward the difference equation (2.1) and imposing the standard transversality condition that the present value of net debt in the indefinite future equals zero.[4]

$$-(1+r)B_t = \sum_{s=t}^{\infty} \frac{1}{(1+r)^{s-t}}(Y_s - C_s - G_s - I_s) \tag{2.3}$$

Defining the quantity $TB_s \equiv Y_s - C_s - G_s - I_s$ as the country's trade balance at time *s*, (2.3) states that for a country to be intertemporally solvent, the present discounted value of future trade surpluses must equal the present value of the country's foreign debts. For a country to remain intertemporally solvent all that is required is that, in the *very long-run*, its external debts be paid. As various authors point out (Milesi-Ferretti and Razin, 1996a,b and Roubini and Wachtel, 1998, for example), (2.3) is a relatively weak criterion of intertemporal solvency as regards signalling an emerging external problem. It neither imposes any structure on future events, nor allows for the incorporation of future events or policy decisions into the equation. No mention is made of any behavioural assumptions regarding market imperfections, risk factors, the evolution or rate of accumulation of foreign debt, or any contagion effects. All it says is that a country can remain technically solvent even while running large external deficits so long as there are sufficiently large trade surpluses at some time in the future.

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[4] Only when $\lim_{T\to\infty}(1+r)^{-T}B_{t+T+1} = 0$ is the country using up exactly the resources its budget constraint allows. If the country this equality does not hold such that $\lim_{T\to\infty}(1+r)^{-T}B_{t+T+1} < 0$, the present value of what the country is consuming and investing exceeds the present value of its output by an amount that never converges to zero. The country is continuously borrowing to meet its debt repayments. Foreign investors would never allow this Ponzi-game at their expense. Conversely, domestic residents would be unwilling to make intertemporal 'gifts' to foreigners if $\lim_{T\to\infty}(1+r)^{-T}B_{t+T+1} > 0$.

2.1.2 Sustainability

Despite its contribution towards understanding aspects of the long-run dynamics of the current account, the solvency criterion is a relatively weak criterion for assessing the long-run stable trajectory of current account deficits. The absence of behavioural aspects from the solvency criterion reduces its capacity to inform policy makers around sustainability issues.

Different definitions of external sustainability have been used in the literature.[5] Although some of the early definitions tend to incorporate the notion of 'equilibrium' to the general understanding of the term, broadly speaking, these definitions have generally understood "sustainability" to mean the continued and stable maintenance of a particular external position. Kindleberger (1969: 874), for example, links the notion of balance of payments equilibrium (which he defines as "the state of the balance of payments of a country, or the world, for a given set of parameters that can be sustained without intervention") with the understanding of sustainability. Given that current account deficits have to be financed through either voluntary capital inflows or the depletion of foreign reserves, Williamson (1983) questions to what extent a country should concern itself over imbalances on its current account. These considerations led Williamson (1983:14) to introduce the notion of "fundamental (balance of payments) equilibrium" as one in which a current account deficit is "equal to the underlying capital flow over the cycle, given that the country is pursuing 'internal balance' as best it can and not restricting trade for balance of payments reasons".

Krugman (1988) questions the sustainability of an external position in the face of "infeasible" debt accumulation. He examines the manner in which the current account (excluding net factor payments) adjusts endogenously to both changes in the real exchange rate and the rate of change of the real exchange rate when uncovered interest parity holds. If the domestic currency is expected to depreciate in real terms enough to reduce the trade deficit sufficiently to prevent "infeasible debt accumulation", then a large current account deficit is sustainable. If, however, foreign debt accumulation is unable to be kept "within the limits of feasibility", the deficit would not be in equilibrium and thus would be unsustainable.

[5] The notion of sustainability has also been applied to the fiscal balance. In this case, the definition of sustainability based on solvency considerations is simpler for fiscal imbalances as these can be largely defined by revenue and expenditure policy decisions (Biggs, 1997). However, as Milesi-Ferretti and Razin (1996b) point out, external sustainability is more complex as it incorporates private and public investment-savings decisions and expectations, as well as the lending decisions of foreign investors.

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Horne (1991:1561) defines an unsustainable external position "as one in which economic variables cannot continue indefinitely on their historical paths as implied by current policies and assumed private sector behaviour". Put a little differently, Milesi-Ferretti and Razin (1996a,b) gauge external sustainability by the extent to which a current account deficit will require a drastic policy shift or lead to a financial crisis. In a similar vein, Roubini and Wachtel (1998) regard a current deficit as sustainable as long as no external sector crisis such as a foreign debt or exchange rate crisis occurs. From these perspectives it would seem that current account deficits are sustainable only if the current macroeconomic policy stance allows for the smooth transition to surplus without any significant adverse effects on the internal balance such as a sharp contraction in consumption or economic activity.

2.1.2.1 The Path of External Indebtedness

Given the relative looseness of the solvency criterion, one approach to imposing more structure on it is to look at the implications of a path of external imbalance for the size of external indebtedness relative to GNP (Howard, 1989) or GDP (Milesi-Ferretti and Razin, 1996a,b; Roubini and Wachtel, 1998). Here, the "sustainable" path of an economy's external debt depends essentially on two factors: (i) the trade balance; and (ii) a debt dynamics term equal to the difference between the world interest rate, (r^*), and the domestic growth rate of the debtor country, (g). If the world interest rate equals the economic growth rate, external indebtedness will be growing relative to the economic growth rate when the trade balance is in deficit. If the country is an external debtor, and if the world interest rate exceeds the growth rate, then the only sustainable path along which the current account (excluding net factor payments) is constant is when the trade balance is in surplus.[6] In order to keep the stock of external debt from rising without limit, the debtor country must generate a surplus on the net trade account in order to be able to service its debt commitments. The more rapid GDP growth, the larger is the "sustainable" level of external debt. If, however, the dynamics of a country's current account suggest that the foreign debt-to-GDP ratio is growing without bounds, this may be perceived to be an effectively unsustainable position. Under these circumstances, financial markets could become uneasy about the country's ability and willingness to repay its debt obligations, precipitating an external crisis.

[6] In the case that $g>r^*$, the present value of the economy's resources would be unbounded and the economy could play "Ponzi games" indefinitely. The intertemporal literature thus assumes that the interest rate is positive

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Even when a country is solvent, its *willingness* to pay and creditors' willingness to lend may become important (Milesi-Ferretti and Razin, 1996a,b). In some cases, a debtor country may, for political reasons, lack the necessary willpower to divert financial resources to servicing its foreign debt commitments. Furthermore, changes in a debtor country's socio-political and economic environment could affect foreign creditors' perceptions of the country and this may influence their decision to continue lending. Using a portfolio diversification model with moral hazard, Milesi-Ferretti and Razin (1996a) show how risk-averse foreign investors' willingness to lend is linked to the variance of domestic returns which, in turn, is linked to the overall degree of macroeconomic stability. In particular, they focus on the vulnerability of the domestic economy to shocks such as fluctuations in the terms of trade. To this extent they also demonstrate how asymmetric information and enforcement problems can play a pervasive role in the international financial capital markets, especially for countries with underdeveloped or inefficient domestic financial markets.

2.1.2.2 Deviations from Equilibrium

An alternative approach to assessing sustainability is to measure actual balances against the predicted imbalance associated with long-run equilibrium. In order to judge whether current account imbalances are excessive and therefore unsustainable, one needs to specify some equilibrium path against which to compare these imbalances. Following Obstfeld and Rogoff (1995), the current account balance can be modelled as the outcome of forward-looking intertemporally optimising households and firms. From a national accounting perspective recall that the current account balance can be expressed as gross national product less domestic absorption:

$$(2.1) \qquad CA_t \equiv B_{t+1} - B_t = Y_t + r_t B_t - C_t - G_t - I_t$$

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and that all economic variables' present values grow at net rates strictly below the world interest rate (Obstfeld and Rogoff, 1995).

Defining the long-run equilibrium or "perpetuity equivalent" of variable X_t as its annuity value at the prevailing interest rate, $\tilde{X}_t$[7], the fundamental current account identity can be shown as:

$$(2.4) \qquad CA_t \equiv B_{t+1} - B_t = (Y_t - \tilde{Y}_t) - (C_t - \tilde{C}_t) - (I_t - \tilde{I}_t) - (G_t - \tilde{G}_t)$$

From this simple equation, current account imbalances in an intertemporally solvent economy reflect deviations of output, consumption, investment and government expenditure from their long-run equilibrium or "permanent" levels. Output above its permanent level contributes to a higher current account surplus because of consumption-smoothing. Instead of increasing their consumption levels in response to a temporarily higher national output relative to its long-run discounted average, individuals choose to acquire foreign assets as a way of smoothing consumption over future periods. High levels of domestic investment that are not met by domestic savings also weaken the current account balance. In this situation, individuals acquire foreign assets in an attempt to finance investment opportunities while avoiding sharp drops in their consumption. High levels of private consumption and government expenditure can also be shown to have the same effects as abnormally low levels of output. A higher current account deficit that allows individuals to minimise the effect of the shock by spreading the impact in any given period over the future. This analysis shows that in the face of *temporary* shocks to the current-period variables on the right-hand side of (2.4) will give rise to a current account deficit. *Permanent* demand or supply shocks need not induce a deficit if both current-period and permanent values move in the same proportion and direction as the shock.

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Equation (2.4) can also be extended to incorporate changes in interest rates.[8] The extended current account equation can be formulated to show that a country's current account depends on deviations of interest rates, output, government expenditure, and investment from their long-run equilibrium levels. If the country is a net foreign debtor and the world interest rate is

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[7] Assuming for the sake of simplicity that $\beta=1/(1+r)$, and that the world interest rate, r^*, equals the domestic interest rate, r, the annuity value of variable X on date t ($\tilde{X}_t$) is calculated from the sum of the discounted values of present and future flows and is given by:

$$\sum_{s=t}^{\infty}\left(\frac{1}{1+r}\right)^{s-t}\tilde{X}_t = \sum_{s=t}^{\infty}\left(\frac{1}{1+r}\right)^{s-t}X_s \text{ so that } \tilde{X}_t \equiv \frac{r}{1+r}\sum_{s=t}^{\infty}\left(\frac{1}{1+r}\right)^{s-t}X_s \quad \text{where X = Y, C, G, I.}$$

[8] See, for example, Obstfeld and Stockman (1995:76) and Obstfeld and Rogoff (1995:1746).

temporarily above its permanent level, the current account will be in greater deficit as foreign interest payments abroad will be higher. Consumption-smoothing will also induce people to maintain present levels of consumption despite higher debt repayments. As in (2.4), output above its permanent level in the extended equation will contribute to a higher current account surplus, again due to consumption-smoothing. Differences in discount rates can also be included in the equation. It can be shown that if a country is more impatient than the rest of the world, there will then be a tendency towards current account deficits, increasing levels of foreign debt and eventually, declining consumption for the country.

2.2 The Stochastic Current Account Model

The implicit assumption of perfect foresight in the discussion so far has excluded the inherent uncertainties underpinning saving and investment decisions. Since the current account is an intertemporal phenomenon, *expectations* about future income growth, investment, and economic policy that underlie consumption and savings decisions need to be incorporated.

The stochastic approach to the current account makes use of the present-value model and is based on an application of Campbell's (1987) paper for testing the permanent theory of consumption.[9] As with the perfect foresight approach, the stochastic approach bases the current account determination upon the permanent-income hypothesis in which consumption-smoothing by private agents is assumed (Obstfeld and Stockman, 1995). Given its incorporation of rational expectations, the stochastic approach allows private expectations about future income growth, investment, and fiscal policy which underlie consumption (and savings) decisions to be measured. By capturing these expectations, the stochastic approach is able to generate forecasts of the optimal consumption-smoothing current account, conditional upon private agents' future expected values of exogenous economic and policy variables. Vector auto-regression (VAR) analysis allows for the econometric modelling of private agents' forecasts of the optimal current account to be compared with the actual values. If the actual deficit exceeds the optimal deficit forecasted by the VAR process, the deficit position may present problems in the future (Ostry, 1997).

[9] A present model for two variables y_t and Y_t, states that Y_t is a linear function of the present discounted value of expected future y_t conditional upon the full public information set $\mathbf{I}_t$ which includes y_t and Y_t themselves and exceeds the known information set $\mathbf{H}_t$ (Campbell and Schiller, 1987).

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The stochastic approach models consumption according to the certainty equivalence principle.[10] In line with the permanent income hypothesis, consumption is given by the expected present discounted value of future output:

$$C_t = \frac{r}{1+r}\left[(1+r)B_t + \sum_{s=t}^{\infty}\left(\frac{1}{1+r}\right)^{s-t} E_t\{Y_s - G_s - I_s\}\right] \tag{2.5}$$

where $E_s\{Y_s - G_s - I_s\}$ is the expected value at time t of $E_s\{Y_s - G_s - I_s\}$ at time s. In a stochastic setting, the certainty equivalence consumption function given by (2.5) implies that an equation similar to (2.4) governs the current account. Here, the present discounted sums in the deterministic setting are replaced by their conditional expected values. Equation (2.4) can thus be replaced by

$$CA_t \equiv B_{t+1} - B_t = \left(Y_t - E_t\tilde{Y}_t\right) - \left(I_t - E_t\tilde{I}_t\right) - \left(G_t - E_t\tilde{G}_t\right) \tag{2.6}$$

such that

$$CA_t = -\sum_{s=t+1}^{\infty}\left(\frac{1}{1+r}\right)^{s-t} E_t\Delta(Z_s) \tag{2.7}$$

where Δ is the backward difference operator and $Z_s \equiv (Y_s - I_s - G_s)$ represents "net output" (Obstfeld and Rogoff, 1995), or the "national cash flow" (Otto, 1992; Ostry, 1997).

Equation (2.7) shows that the current account is in deficit when the present discounted value of the future net output changes are positive. That is to say, a country will run a current account surplus (deficit) only if it expects its net output to be falling (rising) in the future. This result is analogous to the concept of "saving for a rainy day", where households save when they expect future income to fall (Campbell, 1987). Equation (2.7) also summarises the intertemporal model in a convenient way. Permanent shocks will leave the current account

[10] This means that economic agents are assumed to make decisions under uncertainty by acting as if future stochastic variables were to equal their conditional means. Although Obstfeld and Rogoff (1995) assert that certainty equivalence is rarely a rational basis for decisions, this assumption is appropriate because of the use of

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unaffected, as they have no effect on the expected changes in "net output" or the "national cash flow". Temporary output shocks, on the other hand, will cause the right-hand side of Equation (2.7) to fall; that is, the current account to move into a larger deficit (or smaller surplus). This ensures that *planned* consumption will be smoothed in the economy.

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the linear-quadratic utility model which is used extensively in the intertemporal literature to solve for consumption. See Obstfeld and Rogoff (1995: 80-81).

CHAPTER 3

Indicators of Current Account Sustainability

Despite the theoretical underpinnings of current account solvency, sustainability and the notion of "excessive" external imbalances, the econometric modelling remains bounded by its inability to predict or forecast a pending external crisis.[11] Even if the allocation of investment and the public and private saving positions appear sound *ex ante*, so that the external balance looks optimal, unforeseen shocks - a currency crisis, a sharp deterioration in the country's terms of trade, a slowing down of the world economy or even contagion effects - may show that position to be unsustainable *ex post*. Unfortunately, there is no simple rule that can help determine when a current account deficit is sustainable and when not. If there were, external crises would not be so surprising or devastating when they occurred.

Drawing on aspects from the previous chapter, this chapter adopts a non-structural approach to considering several potential indicators that could be helpful in evaluating the sustainability of current account deficits. In particular, a country's macroeconomic structure and policy, its external position, and various market factors are identified as important. Each of these categories is discussed in more detail in the following sections.

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3.1 Macroeconomic Structure

3.1.1 Savings and Investment

As a country's current account can be shown to reflect the difference between savings and investment, it follows for a given current account balance, both actual levels and changes in savings and investment behaviour will have implications for the sustainability of a current account deficit. Perceptions of future savings and investment levels also need to be taken into account. Higher levels of investment may suggest higher future growth levels, which might enhance intertemporal solvency, as indicated by equation (2.3). Higher savings and

[11] Even though the deterministic models are constrained by their limiting assumption of perfect foresight and complete information, they make no claims to any predictive power. Regarding the stochastic approach, it should be noted that the VAR estimation process used does not try to *estimate* the optimal current account using data on the actual current account and the first difference of the national cash flow {as per (2.7)}. Rather the optimal current account (in terms of estimated VAR parameters) is compared with the actual data on the current account to determine whether the deficits (surpluses) have been "excessive". See Ostry (1997).

investment ratios could also have a positive effect on international investors as this might suggest to them a commitment to higher future output levels and hence improved creditworthiness through reduced default risk (Milesi-Ferretti and Razin, 1996a).

However, higher savings and investment levels do not necessarily translate into higher output levels. Investment projects may be allocated inefficiently because of financial market imperfections or relative price distortions towards the non-traded goods sector for example. This would clearly not be conducive to the maximisation of future national output prospects. Another important consideration is the type of investment taking place. Although it has been suggested by Corden (1991), for example, that private savings and investment decisions should be assumed optimal (unless there are particular reasons to believe otherwise), the same has not been said of public investment. Not only are expected returns on public investment harder to quantify, they may be regarded as less efficient than their private sector equivalent. Political priorities and other considerations (such as misaligned incentive structures inherent to the public sector, rent-seeking, nepotism or even outright corruption) may reduce the growth potential of public investment, thus hindering the country's ability to generate future trade surpluses.[12] Under these circumstances, high levels of public investment may not enhance external sustainability. However, this observation must be viewed in light of the potential positive spin-offs from the strong complementarity between public and private investment.

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3.1.2 Economic Growth and Productivity

The theoretical literature examined in the previous chapter suggests that countries experiencing rapid economic growth can sustain higher and more persistent current account deficits without increasing their external indebtedness relative to national output. Although the accumulation of physical capital through investment can enhance a country's ability to service its external debt commitments, the net impact depends on productivity shocks and their effect on investment and national output.

Positive productivity shocks cause investment to rise and the current account surplus (deficit) to fall (rise), at least in the short-run (Obstfeld and Rogoff, 1995). Since the current account

[12] See Tanzi and Davoodi (1997) on how corruption can *increase* public capital expenditure, while reducing its productivity, reducing the quality of existing infrastructure, and hence the overall growth potential.

balance has been shown to reflect future expected net output changes (see equation 2.7), positive unanticipated productivity shocks may not only raise the expected path of future output directly, but could also induce investment, thereby raising expected future output even further. This will tend to worsen the current account as domestic residents borrow abroad to finance the additional capital accumulation. The productivity increase may, however, also increase saving. The net effect on the current account balance will depend on the perceived degree of persistence of the productivity shock, as well as the sectoral source of the shock.[13] For a small open economy, a positive productivity shock occurring in the tradable goods sector would be of more benefit to the country than one occurring in the non-tradable goods sector. The net effect on growth would depend on the relative size of the tradable goods sector as well as the sector's actual and potential export growth capability. Low export growth in the tradable goods sector could indicate exchange rate misalignment that may require some future policy reversal (Obstfeld and Rogoff, 1995).

3.1.3 Openness and Trade Issues

As the current account reflects the sum of net exports and net factor payments, a country's propensity to import and export will influence the sustainability of its external position. The production of tradable goods is an invaluable source of foreign exchange as these inflows can be used to service and reduce the size of the country's external indebtedness. Obviously, countries with larger export sectors, i.e. are more 'open', are able to service their external debt more easily because a smaller fraction of their total export payments are absorbed by these external debt remittances.[14]

Investment and the size of the export sector may also affect and be affected by borrowing and lending considerations. Aizenman (1989) finds that investment in any given sector depends upon the expected incidence of country default and by the relative exposure of that sector to international trade. Furthermore, a rise in country-specific risk is associated with more frequent defaults and consequently a lower level of investment with the resultant drop in

[13] Generally, the more persistent productivity shocks are, the lower is the current account balance. Glick and Rogoff (1995) test this hypothesis for the G-7 countries. They show that while global productivity shocks do not necessarily affect current account balances, the same cannot be said about country-specific shocks. Also see Razin (1995:172-174).

[14] Traditional measures of 'openness' are the ratio of exports to GDP (Roubini and Wachtel, 1998) and the average share of imports plus exports as a percentage of GDP (Milesi-Ferretti and Razin, 1998).

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investment larger in sectors with a greater reliance on international trade. Linking the probability of debt default with the extent of a country's 'openness', Aizenman (1989) asserts that the more 'open' an economy is, the less likely it is to default on its external debt commitments.[15] Not only is the threat of default sanctions such as restrictions on the flow of trade or financial assets very real, there may also be a stronger commitment not to default on external debt obligations the larger the export sector. A larger export sector would imply a larger domestic constituency which would likely oppose any actions which might result in costly foreign disruptions for the home country (Milesi-Ferretti and Razin, 1996a).

An economy's external vulnerability can also be affected by exogenous shocks such as sharp terms of trade fluctuations or falls in foreign demand. This vulnerability is increased the less diversified the country's export sector is, and the more dependant its sectors are on imported inputs. Given that a country's export earnings can be used to service and reduce its external debt, countries with larger tradable goods sectors would be able to service their external commitments with greater ease.

3.1.4 Domestic Financial Structure

The soundness of the domestic financial system, particularly the banking sector, has direct bearing on a country's ability to sustain an external imbalance. As domestic financial markets become increasingly integrated with global capital markets, the importance of well-functioning and well (not over-) regulated financial markets has been demonstrated. The proliferation of large-scale banking sector problems that have emerged in a number of developed economies, developing countries and economies in transition in the 1980s and 1990s have raised widespread concern over the consequences of these crises. Aside from the resultant reduction in investment and consumption, these crises may also threaten the functioning of the payments system, undermine confidence in the domestic financial system and may thus cause a fall in domestic saving and large-scale capital outflows. It would seem intuitive then that the existence of well-functioning financial markets can reduce the risks of

[15] Aizenman (1989:89) however finds this observation dependent upon the centralised decision-maker's periodic assessment of the relative costs and benefits of external debt default.

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potential instability as well as attract more foreign investment, thus reducing the probability of an external crisis.[16]

The multitude of financial (mainly banking) crises and central bank bailouts over the past two decades have highlighted the issues of financial sector depth and breadth, as well as the regulatory environment governing this sector.[17] Although the specific causes of these crises differ, they have regularly originated in or induced insolvency in the banking system, and typically featured a collapse in asset prices, most often in equity and security markets (Caprio, 1998). The extent to which a financial crisis threatens the sustainability of a country's external position depends on whether it results in a currency crisis. Although these two forms of crisis are inextricably related, they can occur independently of each other. Financial crises can occur without any currency crisis, as witnessed in many cases in Africa and in transition countries (Caprio, 1998). Conversely, currency crises can occur independently of any financial crisis.[18] However, the probability of one type of crisis inducing a manifestation of the other very often depends on the severity of the 'original' crisis.

Financial crises often occur when depositors lose confidence in a country's domestic financial system. This may induce a self-fulfilling financial crisis if they decide that a bank (or banks) will become insolvent. Assuming the rush to withdraw funds is large enough, the domestic banking sector can become illiquid. If the run reflects the self-fulfilling beliefs of domestic depositors, foreign investors may still be willing to lend to the country. In this situation, a currency crisis may be averted. If, however, the loss of depositor confidence is due to a genuine deterioration in the balance sheets of the domestic banking sector, foreign creditors may be unwilling to step in – unless they expect to be bailed out by the authorities (see IMF, 1998c). In the case of the decline in deposits not being matched by an increase in foreign inflows, the run will then result in a net capital outflow. The speed and magnitude of these capital outflows will largely determine to what extent any currency crisis materialises. As

[16] It must be noted here that the existence of well-functioning domestic and international financial markets can also increase the probability of an external crisis if foreign capital flows comprise mainly temporary or "hot" flows.

[17] One of the best-known examples of banking crisis is the US Savings and Loan crisis of 1980-92. Although international financial linkages played virtually no role in the crisis, the cost of the bailout to the US Federal government is estimated at $127 billion or 2,3 percent of GDP (Lindgren, Garcia and Saal, 1996, in IMF, 1998c: 44).

[18] As the 1992-93 ERM episode shows, a (mild) currency crisis need involve neither a corporate debt problem nor a banking crisis in the domestic financial sector. However, a severe currency crisis, triggered by foreign investor panic for example, can create a financial crisis if the domestic banking sector is over-leveraged or over-exposed to foreign currency risk (IMF, 1999).

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empirical evidence from Latin America shows, it was the reluctance of foreign creditors to continue lending to countries such as Columbia, Peru, Argentina and Mexico in 1982 that eventually lead to severe banking crises in these countries (IMF, 1998a). More recent evidence shows that Thailand's banking crisis during the latter part of 1997 quickly turned into a balance of payments crisis after the government had used a large proportion of the country's reserves to cover the dollar-exposure of its domestic banks (Parma, 1998). When the government later has to defend its exchange rate with low levels of foreign reserves, it had no option but to allow its currency to float.[19] This floatation soon turned into a foreign exchange crisis with the eventual collapse of investor confidence in some East Asian countries. Faced with panic capital outflows, many of these countries had to experience sudden current account deficit reversals.

Currency crises can also induce a financial crisis. A sudden loss of confidence in the domestic currency for example may result in a financial crisis if depositors attempt to convert their currency into foreign exchange. Demirgüç-Kunt and Detragiache (1998) find that banking systems that are less capitalised or those that find themselves over-exposed to interest rate or foreign exchange maturity mismatch are less likely to survive the shock.[20]

Although the specific causes of financial crises have tended to centre on micro- and macroeconomic factors, recent evidence has stressed the importance of institutional factors, with particular emphasis on the strength of domestic financial systems (Drees and Pazarbasioglu, 1995; Griffith-Jones, 1997; Caprio, 1998; Parma, 1998).[21] In the case of the 1994 Mexican crisis, the pace of deregulation of the domestic financial sector and the capital account proved too rapid. The process of rapid liberalisation of the capital account coincided with a process of re-privatisation of the commercial banks as well as with a change in monetary policy, which implied the elimination of reserve requirements (Griffith-Jones, 1997). These changes in credit and monetary policy, accompanied by the re-privatisation process, meant that bankers were not experienced in evaluating credit and market risks. Unfortunately, these fundamental changes in the operation of the financial system were not matched by sufficient efforts at bank supervision and regulation. The very rapid deregulation

[19] The Thai baht was floated on 2 July 1997.

[20] Although Demirgüç-Kunt and Detragiache (1998) find that various macroeconomic factors, such as high inflation, high real interest rates, and low GDP growth are common to all banking crises, they also find that the degree of capitalisation, the degree of market concentration, and the liquidity of the inter-bank market *inter alia* also play an important role in influencing these crises.

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of the financial sector and the capital account leading to financial crisis has also occurred in developed countries. Drees and Pazarbasioglu (1995) show how the elimination of controls on lending and exchange restrictions in the Nordic countries triggered a significant increase in lending to previously credit-rationed borrowers. Like in the Mexican case, the relevant authorities did not tighten prudential bank regulation quickly enough in response to the subsequent surge in lending and associated increase in risk-taking by commercial banks. Unlike the international debt crisis of the early 1980s, the East Asian financial crisis that began in mid-1997 was not driven by 'traditional' macroeconomic imbalances or instability. For the countries most directly involved – Thailand, Indonesia, and South Korea – all had relatively favourable macroeconomic indicators such as low inflation, fiscal balance or surpluses, and exceptionally high saving rates. It was, however, the accumulation of short-term private foreign debt relative to foreign reserves, increasing debt service ratios, booming private credit extension, and increased unhedged private foreign exposure that have been blamed for much of the crisis (IMF, 1999). Even countries such as Japan had the true extent of their financial and corporate sector vulnerability exposed in the wake of the crisis.

Despite efforts to improve financial sector regulation and supervision, banking difficulties may not always be immediately apparent. Inherent market imperfections such as information asymmetry, for example, may blur the real picture. With world financial markets having become increasingly dominated by intermediaries, international borrowers and lenders may sometimes not have full or even near complete information on each other. The by-products of information asymmetry – adverse selection and moral hazard – combined with excess international liquidity, over-optimistic expectations, distorted domestic incentives and inadequate financial market regulation and supervision have been suggested as some of the main culprits of the East Asian crisis (Parma, 1998). In the case of many East Asian countries, and even Japan, the fragility of the banking sector was fully revealed following a run on the domestic currency. However, irrespective of the direction of causality, the costs of a financial crisis can be huge (IMF, 1999). Not only are there real costs in terms of lost output and possible unemployment, a bailout by the central bank or government could place undue pressure on the fiscus and might create the market expectation of future bailouts by the authorities, creating a new set of moral hazard problems.

[21] See Caprio (1998) for additional references.

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3.1.5 Capital Flows and the Capital Account Regime

The significant increase in flows of foreign capital to DET countries has raised important macroeconomic issues around the causes of these flows, responses by recipient countries to these flows, as well as concerns about the sustainability of these flows.[22] Although the first two considerations are informative from a policy perspective, the issue of sustainability of capital flows is of fundamental importance to any imbalance on the current account.

From a theoretical perspective, a free and open system for capital movements allow for the efficient allocation of world savings to their 'optimal' use and this enhances the welfare of both borrowers and lenders through the creation of opportunities for portfolio diversification, risk-sharing and intertemporal trade. As the models in the previous chapter show, borrowers are able to maximise their welfare intertemporally if allowed to smooth their consumption paths in the event of adverse shocks to national output. Lenders are able to maximise their welfare by being able to diversify their portfolios abroad. Although the benefits of increased international capital mobility may hold true on a certain level, the theoretical presumption in favour of free and open international capital markets is weakened by the presence of asymmetric information and domestic distortions. Whether any liberalisation of domestic and international financial markets is welfare enhancing depends on the nature of those distortions, on the extent of information asymmetries and on the severity of the adverse selection, moral hazard and market inefficiencies that result (IMF, 1998c).

Despite the potentially problematic consequences of a free and open capital account, the financial innovation and liberalisation in recent years, both domestic and international, have become parts of an inevitable process for many countries wishing to take advantage of the substantial benefits of broad participation in the global economic system. The liberalisation of world financial markets, however, has not come without its costs. Sharp changes in investor sentiment can wreak havoc on a country's domestic economy with often severe macroeconomic and social costs (IMF, 1999). For this reason, many countries have tried to limit the openness of their financial markets through a number of capital account controls on both residents and non-residents alike. These controls have included, amongst others, the South African financial rand mechanism and unremunerated reserve requirements on foreign

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loans in Chile (IMF, 1997c). In many cases the rationale for imposition and maintenance of capital controls has been attributed to certain political and structural features of an economy (IMF, 1993). These include the desire to limit short-term capital flows; to retain domestic savings; to sustain stabilisation and structural reform programmes; and to maintain the domestic tax base. Not only do capital controls create distortions in domestic financial markets vis à vis world markets, they can also have significant macroeconomic and distributional consequences (Grilli and Milesi-Ferretti, 1995). The desired outcomes of these consequences are however dependant upon the effectiveness of the control mechanisms. However, given the explosive growth in international financial transactions and the increasing size of these flows over the past decade, capital account controls in today's world seem a heavier and more difficult burden to bear.

Concerns that inflows may threaten the macroeconomic stability arise in part from a fear that capital flows might be transitory. Although even permanent inflows can create adjustment problems, inflows that are not sustained can potentially destabilise the domestic economy when they arrive and when they depart. At issue here is the expected time path of the factors driving these flows as well as the corresponding implications of these foreign flows. The announcement by the United States Federal Reserve of drop in its prime lending rate for example could increase incentives for international investors to reallocate a percentage of their portfolios abroad in search of higher returns. Since this scenario is likely to be indicative of a cyclical change in the global economic environment, one might expect these flows to be reversed in the event of the Federal Reserve tightening monetary policy. Structural changes to an economy or changes in a country's macroeconomic fundamentals could induce a more permanent inflow of foreign capital. Long-run trends, such as growing ageing populations in the industrialised countries for example and the subsequent pressure on pension and life funds to grow sufficiently to fulfil future financial commitments, could lead to a more long-term and hence sustainable level of capital flows (Leape and Khatri, 1998).

Given the critical relationship between the current account and the capital account, issues of openness and flexibility are of crucial importance to the sustainability of a current account deficit. Although increased capital account flexibility is likely to increase a country's vulnerability to sudden capital reversals, this same openness and flexibility could also have a

[22] See, for example, Fernández-Arias and Montiel (1996) for evidence on developing countries, and Leape and

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disciplining effect on the domestic economy. In the eyes of overseas investors, a country with a more open capital account would be more committed to adopting and maintaining more responsible and hence "sustainable" macroeconomic policies.

3.2 External Factors

3.2.1 Composition of External Debt and Foreign Reserve Levels

In addition to the macroeconomic challenges posed by these large and often volatile capital flows, the composition of a country's external liabilities can affect its ability to manage its external position. If a country's investment needs exceed available resources, the deficit balance on the current account has to financed by a capital inflow or the accumulation of foreign debt. A country's ability to successfully manage and sustain an external imbalance is thus affected by its stock of foreign assets, and the existing size, nature and repayment on its external liabilities. To this extent, swings in international exchange rates and interest rates can be potentially devastating, especially if a large part of a country's foreign debt is classed as short-term.

The currency composition and maturity profile of a country's external debt can contribute as much to its vulnerability to external shocks as the total volume of debt. This fact was borne out by the 1994 Mexican crisis where financial markets' concerns about Mexican risk were attributed primarily to the currency composition and maturity structure of the public debt rather than its size (Griffith-Jones, 1997). In the case of Mexico, the vulnerability of the country's government to an external crisis was exacerbated by US$29 billion of *tesobonos*[23] maturing in 1995 against the country's low level of foreign reserves (US$6,3 billion) at the end of 1994. Although much of East Asia's pre-crisis foreign debt was privately-held, for three of the worst affected countries – South Korea, Thailand and Indonesia – short-term debt-to-reserves ratios had risen to well over 100 percent by mid-1997 (IMF, 1999:61). The high levels of short-term foreign debt in these countries were also associated with a broader indicator of external vulnerability, the ratio of M2 money to foreign reserves. By June 1997, Indonesia and South Korea had ratios of M2-to-foreign reserves in excess of 600 percent. The Philippines and Thailand were not any better off with their ratios just below 500 percent.

Khatri (1998) for a South African perspective.

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Another important concern is the nature of the foreign liabilities. Since the 1970s the composition of foreign flows to developing countries has undergone significant change in response to various factors. During the 1970s capital flows to these developing economies took the form of mainly syndicated bank loans. Following the slowdown of the world economy, large increases in world interest rates, and sharp losses in their terms of trade towards the end of the decade, many developing countries were severely hit by the sudden reduction of capital inflows to their economies. Weak economic policies and institutions in these economies eventually lead to the international debt crisis that manifested in the early 1980s. Post-crisis lending to these countries took the form of mainly official loans from international financial institutions to support policy and institutional reforms (Corbo and Hernández, 1996).

The 1990s have witnessed a major transformation in the nature of foreign flows with private capital inflows to emerging markets having increased significantly.[24] Although the recent marked reduction in these flows are primarily due to the continued effects of the East Asian crisis, the rise in private capital flows contrasts with the significant relative fall in official flows to emerging markets during the 1990s. The impact of the East Asian crisis has however required an increase in net official development finance to many countries to help boost their holdings of foreign reserves. While non-concessional flows increased in response to the East Asian financial crisis, concessional flows have continued their overall decline (IMF, 1999). Despite the volatile nature of short-term capital inflows, the costs of adverse shocks to an economy can, in principle, be absorbed by asset-price adjustments and partially borne by foreign equity investors through these equity price adjustments (Milesi-Ferretti and Razin, 1996a). A disproportionate amount of the costs may, however, fall on the domestic economy. A current account deficit that is financed through long-term inflows such as foreign direct investment (FDI) is more sustainable than a deficit financed by temporary inflows. Regarding debt as a whole, a higher incidence of foreign-currency denominated debt, a higher ratio of short-term debt to total debt, the bunching of debt redemption, and variable interest rates (compared with a fixed coupon) are likely to enhance the risk of an external crisis.

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[23] Short-term, dollar-denominated public debt instruments.
[24] Having peaked at their record high level during 1997 (about US$291 billion), net private capital flows to all developing countries plummeted to just over US$137 billion for 1998 by September 1998 (IMF, 1999:25).

Foreign debt usually has to be repaid in foreign currency. For this reason a country's level of foreign asset reserves will have a direct bearing on the sustainability of an external position. The existence of large foreign reserves will allow a country a greater capability to import necessary goods and services as well as to pay off its foreign debt at a lower cost. A traditional measure of the adequacy of foreign reserves is the stock of reserves in months of imports. An additional indicator of reserves adequacy is the ratio of money assets to foreign reserves, because in the event of an exchange rate crisis liquid money assets will be needed to be converted into foreign exchange (Roubini and Wachtel, 1998). Using a system that monitors the deviation of several economic indicators beyond some threshold value - the so-called "signals approach" – Kaminsky *et al.* (1998) find that changes in international reserves are a good predictor of a possible currency crisis.[25] It would appear then that countries with large foreign reserves and a small external debt burden of appropriate composition and maturity structure are less likely to run the risk of having an unsustainable external position.

3.2.2 The Real Interest Rate

A country's ability to sustain a current account deficit is influenced not only by the size and nature of existing liabilities and the stock of foreign assets, but also by the extent of its debt-servicing burden. While there has been a radical transformation in both the composition and magnitude of international capital flows over the past decades, with many international investors moving away from debt instruments in favour of equity instruments, significant increases in the cost of foreign debt will impact on the debtor country's current account. The net impact will, however, depend on factors such as changes in the domestic macroeconomic environment, the foreign debt-to-GDP ratio, as well as on the interest structure on the loans, which affect the current account directly.

Contractual repayments to foreign creditors will depend on changes in the domestic macroeconomic environment as well as on the interest structure on the loans. Although debt repayments are denominated in nominal terms, it is the real rate of return that matters to both debtor and creditor.[26] Unexpected inflation in the debtor country or increases in the real

[25] See Table 1 of Kaminsky *et al.* (1998:20) for a detailed explanation of the "signals approach".
[26] International lenders usually take as their benchmark for the international risk-free interest rate the dollar London Inter-Bank Offer Rate (LIBOR) (Demirgüç-Kunt and Detragiache, 1994). To obtain the relevant rate

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growth rate in a debtor country for example would also serve to reduce the real value of its foreign debt. In these situations the debtor country would be able to expend less real resources in servicing its debt repayments. However, times of upward pressure on real world interest rates – like the significant increases witnessed during 1981-1982 when real interest rates hardened sharply from their very low and even negative values during the late 1970s – places increased pressure on a country's current account.[27] As the case of the early 1980s shows, it was not before long until many highly indebted developing countries, especially those in Latin America, began to feel the squeeze of higher foreign debt repayments which eventually manifested in the well-documented debt crisis of 1982.[28] Although variable interest rates compared with a fixed coupon would be expected to enhance the risk of an external crisis, Demirgüç-Kunt and Detragiache (1994) find that both fixed rate debt and floating rate debt were, on average, equally expensive for highly indebted countries during the 1980s debt crisis.

The net impact of any real interest rate increase on the current account will however depend on countries' foreign debt-to-GDP ratio, as well as on their particular real economic growth rates. As section 2.1.2.1 shows, a sustainable path for external debt relies on the merchandise trade account and a "debt dynamics" term. Assuming (not unrealistically) that the foreign real interest rate exceeds the real domestic growth rate, the only sustainable path along which a country's current account is able to continue is through a trade balance surplus. Provided then a country is able to increase its national output through higher net exports relative to its external debt levels, it is less likely to fall foul of its external creditors. If, however, a country experiences a significant and prolonged downswing in its business cycle, solvency and liquidity pressures may drastically increase the probability of default. As the evidence from the debt crisis in many developing countries during the early 1980s shows, a combination of factors, including sluggish growth in the industrial countries, rising global interest rates and

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for a particular debtor country, the benchmark rate is then adjusted to include expected future movements in both the inflation rate and the exchange rate in the debtor country as well as any other country-specific factors that might potentially affect the relative risk of the loan.

[27] Blanchard and Summers (1984) attribute mainly a mix of contractionary monetary policy in Europe combined with an expansionary fiscal stance (especially in the United States) for the sharp increase in real interest rates between 1978 and 1982.

[28] Certain Latin American countries, such as Argentina and Chile, experienced significant increases in their foreign debt burden following the crisis. In 1984, the ratio of interest payments to exports for these countries stood at 46.1 and 50.3 percent respectively, up from near single-digit figures pre-1980 (World Financial Statistics, 1999).

falling commodity prices, seem to have been responsible for the adverse turn of events (Kaminsky and Pereira, 1996:2).

Changes in the real interest rate can also affect the current account through its impact the capital account. Since changes in real rates affect the relative rates of return of various financial assets, these changes have a guiding influence on the direction of international capital flows. Not only are international investors expected to adjust their stock of funds across different financial assets as part of a portfolio diversification strategy, *ex ante* interest rate differentials are also likely to affect subsequent capital flows. Fernández-Arias and Montiel (1996) present evidence that lower interest rates in the United States have been a key driving factor determining the magnitude of capital flows to creditworthy developing countries. As discussed in section 3.1.5, these types of flows are likely to be relatively temporary and hence less sustainable. Given today's world of increasingly mobile capital flows and integrated capital markets a country has to therefore ensure the proper management of its foreign liabilities. This includes the appropriate structuring of the currency denomination, maturity and interest rate profile of its foreign debt by active hedging in swap markets, as well as ensuring its interests regarding the conditions of repayment and any default clauses are equitably represented in a solid legal environment (IMF, 1997c).

3.2.3 The Real Exchange Rate and Terms of Trade

The real exchange rate indicates a country's degree of competitiveness in international markets and is therefore, along with any 'misalignments', of particular policy importance.[29] While there is no single definition of the real exchange rate, there is, however, a range of difficulties associated with its measurement (Aron, 1997). A widely used definition of the real exchange rate is the relative price of tradables to non-tradables (Edwards, 1989). Any sustained structural deterioration of the trade balance in this case would make a current account deficit even less sustainable.

When discussing real exchange rate movement, it is necessary to distinguish between those exchange rate changes that appear to reflect overshooting effects and those that reflect

[29] One of the most striking examples of currency misalignment is the 50 percent real appreciation of the US dollar between 1980 and early 1985 (IMF, 1994). During this period the country's current account deficits were mainly attributable to widening trade deficits that only narrowed in 1990.

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changes in economic fundamentals. Put a little differently, it needs to be ascertained to what extent significant fluctuations in the real exchange rate reflect deviations from its 'equilibrium' value, or instead represent the transition to a new equilibrium rate.[30] Although real exchange rate appreciation is not necessarily adverse, the source of the real appreciation has important implications. If a change in the country's economic fundamentals reflects inappropriate domestic policy choices, sustained real appreciation would see the transfer of real resources away from the tradable goods sector towards the non-tradable goods sector. Any sustained structural deterioration of the trade balance in this case would make a current account deficit even less sustainable.

There may, however, be certain factors driving real exchange rate changes that do not raise questions about current account sustainability. During the early stages of its development, country may experience a real exchange rate appreciation in response to inflows of foreign savings to finance the capital needs of the growing economy. Foreign capital inflows may also respond to countries that are in a phase of economic transition.[31] In their move to a market economy, many former Communist and Eastern Bloc countries have experienced a sharp appreciation of the nominal exchange rate that translated into a strong real appreciation (Roubini and Wachtel, 1998). In this regard, a real appreciation could merely reflect the movement towards a new long-run equilibrium real exchange rate after an initial upward overshooting. A real exchange rate appreciation in this instance would not necessarily indicate a pending unsustainable position. It would likely reflect investors' expectations of the increased productivity of higher returns to their capital. However, as Milesi-Ferretti and Razin (1996a) lament, the difficulty lies in evaluating to what degree a real appreciation reflects improvements in the fundamentals.

Despite a beneficial development role for foreign capital, these inflows can pose a potential problem for recipient countries. According to Reisen (1997:17), the "real appreciation problem" appears when capital inflows are mostly consumed rather than invested, as was the case in Mexico and Argentina during the early 1990s and in Thailand during 1990-1996. In these cases, large current account deficits were associated with large increases in foreign

[30] Although real exchange rate misalignment can generally be defined as "sustained deviations of the actual real exchange rate from its long-run equilibrium level" (Edwards, 1989:8), measuring the extent of any misalignment poses a number of empirical problems (Aron, 1997).

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exchange reserves and real exchange rate appreciations. The size of these capital flows were shown to exceed the magnitude of their current account, and in the absence of sterilisation by the monetary authorities, lead to a nominal exchange rate appreciation. It is these substantial capital flows – that were approximately 11.5 percent of GDP in the case of Malaysia in 1996 for example – that artificially maintained the strength of the Mexican peso and the Thai baht in the run-up to the respective Latin American 1994-1995 and the recent East Asian crises. This gave the wrong signal about the long-run sustainability of the persistent current account imbalances of these countries (Roubini and Wachtel (1998).

Strongly related to movements in the real exchange rate are a country's terms of trade, defined as the index of export prices to the index of import prices. A strengthening of the real exchange rate or negative shocks in foreign demand for example would put downward pressure on the domestic country's terms of trade. This might subsequently raise questions about the sustainability of a current account deficit. The impact on the terms of trade following an external shock would also depend on the degree of the country's 'openness', with more 'open' and less diversified economies exposed to more variation in their terms of trade.

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3.3 Macroeconomic Policy Stance

3.3.1 Exchange Rate Policy

Given the importance of exchange rate policy in determining a country's external competitiveness, it is one of the more significant aspects of domestic macroeconomic policy. Any domestic imbalances (i.e. those that are not compatible with the economy's potential level and rate of growth of production) will result in movements of domestic price levels and costs that differ from those abroad. Although there is no definitive answer to the question of whether an open economy is better off under a fixed or a flexible exchange rate, the decision either way can influence a country's internal and external balance.

[31] A number of post-mortem analyses have attributed real exchange rate appreciation in many emerging and transitional economies during the first half of the 1990s to large capital inflows (Edwards, 1997). See Calvo *et al.* (1993) for reasons for recent capital flows into selected Latin American economies.

The choice of exchange rate regime tends to revolve around four crucial issues: the relationship of economies within the global economic system, the nature of an economy's structural characteristics, its susceptibility to external shocks, and the degree of activism envisaged for domestic policies (Guitián, 1994; IMF 1997b). Fixed exchange rate arrangements (including pegged regimes) have been argued to deliver increased economic stability by placing a degree of discipline on an economy's domestic monetary and fiscal policies. However, questions about the sustainability of an exchange rate peg will strongly influence the possibility of a currency crisis, as seen in Mexico and East Asia. Any misalignment of the domestic currency due to expansionary monetary or fiscal policies can lead to a speculative attack which can force a government to involuntarily abandon its fixed exchange rate arrangement. Here, the issue of credibility and maintenance of a fixed (or relatively inflexible) exchange rate has received increasing attention in the literature (Drazen and Masson, 1994, and Holden and Vikøren, 1996, for example).

While the success of exchange rate pegs have been long-lived – such as Francophone Africa and in the Common (Rand) Monetary Area, in recent years, developing countries have increasingly moved towards more flexible exchange rate arrangements (IMF 1998a).[32] Since the exchange rate is an inherently forward-looking economic variable, any misalignment of certain macroeconomic fundamentals can threaten the sustainability of a fixed exchange rate commitment. Periods of expansionary monetary policies that lead to high inflation, overvaluation and large external imbalances can lead to a speculative attack by international investors. This will invariably force a government to involuntarily abandon its fixed exchange rate arrangement.[33] However, recent events in international financial markets, such as the speculative attacks on the Mexican peso in December 1994 and the Thai baht in May 1997, have prompted new analysis into the reasons behind the attacks. While the early balance of payments crises *à la* Krugman (1979) originate from a monetised fiscal deficit, the most recent crises occurred in the context of mild fiscal surpluses in these countries. Despite this,

[32] The general trend toward greater exchange rate flexibility for many developing countries since the late 1970s and early 1980s has been attributed to movements in the British pound and the US dollar, exposure to a higher incidence of external shocks during the early 1980s as well as the rapid acceleration of inflation in many developing countries during this decade (IMF, 1997b).

[33] Krugman (1979) provides the classic theoretical model of a speculative attack. Assuming a fixed exchange rate, domestic credit expansion in excess of money demand growth leads to a gradual but persistent loss of international reserves, thus weakening the current account. Eventually reserves fall to a critical threshold at which a speculative attack is launched, eliminating the authorities' remaining foreign assets. This ultimately causes the collapse of the peg.

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major financial disruption and the loss of policy credibility forced Mexico and Thailand to abandon their currency pegs (or bands).[34]

3.3.2 Fiscal and Monetary Policy

Inappropriate domestic economic polices can also threaten the sustainability of an economy's external position. Expansionary monetary policy or weak fiscal discipline can place pressure on the balance of payments by changing real income or real interest rates. This can create problems for both the management of the exchange rate regime and the stock of foreign reserves.[35] However, as the recent experience in East Asia shows, generally sound management of monetary and fiscal policy, even over an extended period, provides no guarantee against balance of payments crises.

Imprudent fiscal and monetary policies can affect the sustainability of an external position through one or both of the following: a 'consumption effect' via the current account; or a perceived threat of government insolvency. As regards the former, one needs to ascertain what effect the fiscal position has on the current account. Although the net effect of a change in fiscal policy depends on the particular exchange rate regime, changes in the fiscal stance can trigger changes in aggregate demand.[36] These can come about through movements in the real interest rate, the real exchange rate and the real level of income, all of which can ultimately affect the external balance. Under a fixed exchange rate regime for example, an expansionary fiscal policy causes domestic interest rates to rise and the current account to move into deficit. These higher domestic interest rates attract an inflow of foreign savings that allow for the financing of the current account deficit.[37]

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[34] See Calvo and Mendoza (1996) and the IMF (1999), for example, on currency crises in Mexico 1994-1995 and East Asia 1997-1998 respectively.
[35] The speculative attacks on the Italian lira, the British pound and the Spanish peseta in 1992 for example have been attributed to inadequately restrictive fiscal and monetary policies (Bank of International Settlements, 1993).
[36] In a fiscal sense, the notion of "expansionary" and any subsequent effect on aggregate demand, is a highly subjective (Buiter, 1985:54). A reduction in the fiscal surplus or an increase in the fiscal deficit can both be regarded as "expansionary", although only the latter might elicit some degree of market concern.
[37] What was to become known as the "twin deficits" phenomenon emerged as a salient macroeconomic problem for a number of industrialised countries during the 1980s (Bachman, 1992). The policy prescription of having to reduce the fiscal deficit in order to reduce the current account deficit became known as the "Lawson doctrine" after the UK's Chancellor Nigel Lawson's balance of payments speech to the IMF in September 1988 (Reisen, 1997:11).

While the net effect of fiscal deficits on the current account and the overall balance of payments remains an empirical issue, the magnitude of these fiscal deficits and the way in which they are financed are of particular importance.[38] If a fiscal deficit is financed by issuing debt, the fundamental issue is whether or not the current account is independent of the time profile of the government's taxation and expenditure decisions (Barro, 1974). Within an intertemporal framework, (2.4) shows that if "debt-neutrality" holds[39], there will be no effect on the current account. Any increase in government expenditure by acquiring higher domestic debt will not induce higher levels of current consumption. The net result will, however, depend on the degree of substitutability between public and private savings. The less substitutable public and private savings are the higher the correlation between the fiscal deficit and the current account deficit will be.

Taxation policy is also likely to influence the current account through its possibly distortionary effects on disposable income and the net returns on investment (Milesi-Ferretti and Razin, 1996a), with ambiguous effects on the current account. Lower taxes today could increase current disposable income and increase the net returns on investment. Higher levels of investment financed from abroad would cause the current account to worsen in the current period. However, the current account deficit could be partially offset by the higher levels of future domestic output. Higher disposable income could also weaken the current account if private agents increase their consumption of both local and foreign goods and services. A larger current account deficit due to higher investment levels would tend to indicate a more sustainable position relative to an external imbalance created by higher levels of private consumption.

Large and growing fiscal deficits can also place an additional constraint on government expenditure. Concerns about the possibility of a public sector financial meltdown can cause both domestic and foreign lenders to question the sustainability of a country's fiscal stance. Excessive government deficits may cause local and domestic private agents to lose confidence in the government's ability to remain solvent. Fears of the government falling into

[38] See, for example, Biggs (1997) for a recent analysis of the sustainability of South Africa's fiscal position.
[39] This means that private agents fully internalise the effects of higher public debt, i.e. higher public deficits today imply higher taxes in the future such that higher government dissaving today translates into higher private savings to offset the higher tax commitments in the future. Buiter (1985:15), however, states that the assumptions for deficit neutrality are "hopelessly unrealistic".

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a debt trap[40], with government then forced to either default on their debt-repayment commitments or to redeem debt through money creation, will cause financial market instability due to perceptions by private agents of increased sovereign and country-specific risk. In this case, questions about fiscal insolvency could induce a sudden reduction in international capital flows and this could, in turn, precipitate a current account reversal.

Unsustainable government policies may also cause an exchange rate to collapse. Although fiscal deficits should lead to capital inflows (and an exchange rate appreciation), if investors perceive the large fiscal deficits to be a warning signal of potential macroeconomic instability, the increased risk may lead to a capital outflow and exchange rate depreciation. Assuming a fixed exchange rate regime, Daniel (1997) shows that only when there is a policy change toward expansionary domestic credit creation *and* the fiscal constraint is satisfied, is a delayed predictable exchange rate collapse possible as in Krugman (1979). However, if the fiscal constraint is violated, an exchange rate collapse occurs immediately as agent's attack to reap the speculative profits.

Monetary policy has similar impacts on the current accounts. An expansionary monetary policy for example will cause the trade balance to weaken as more foreign goods and services are purchased. Upward pressure on domestic prices may in turn weaken the country's international competitiveness as the real exchange rate appreciates. The net effect on the capital account is, however, likely to be ambiguous. While the expectation of higher future inflation is likely cause capital to flow to markets yielding higher real returns, higher nominal interest rates may serve to stem the outflow.

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3.4 Expectations, Socio-Political Stability and Credibility

The rational expectations literature tells us that economic agents are forward-looking individuals whose decisions are based on the incorporation of all past and current information on future expected values of various variables. Applying this to an understanding of the external balance, one would expect financial market variables to reflect in principle all available information on the external viability of a country. Although this strong form of rational expectations may be reasonably considered as being particularly stringent, financial

[40] Van der Merwe (1993:2) defines the debt trap as "an unsustainable government financial position in which an

markets have displayed a degree of irrationality where market prices of assets have been shown to differ from their fundamental values.[41]

Market information has also been shown to influence movements in macroeconomic variables. One would expect that if financial markets are informationally efficient, only unanticipated information should affect financial prices. As Karfakis and Kim (1995) show in the case of Australia, bad news about the current account deficit has been found to drive Australian dollar exchange rates and interest rates.[42] Flood and Garber (1994) also show how bad or unexpected news about domestic credit extension in a system of fixed exchange rates can induce an exchange rate collapse. The herd behaviour of speculators profiting from the "shadow floating exchange rate" vis à vis the fixed exchange rate causes the eventual collapse of the fixed exchange rate regime. When uncertainty is introduced into the model, they find that even a small disturbance can collapse the system. In this instance it would seem that movements in asset prices could be attributed to the self-fulfilling prophecies of market participants thus further exacerbating the likelihood of a crisis.

Milesi-Ferretti and Razin (1996a) question to what degree it is sufficient to rely on a set of financial market indicators that signal the likelihood of a major policy shift or crisis situation. A strong reliance on market-based indicators may be insufficient to signal problems in timely manner, as the Mexican peso crisis in December 1994 and the more recent East Asian crisis suggests. Despite fiscal restraint and historically and relatively moderate ratios of foreign debt to both GDP and exports, the foreign investors perceived the various pressures in these economies as being a source of significant macroeconomic instability that threatened the future sustainability of the countries' external position. More recently, the combination of excessive international liquidity and over-optimistic expectations of future performance in borrowing countries was an important detonator of the East Asian crisis (Parma, 1998). In this instance, the large amounts of excess liquidity in under-regulated international financial markets at first exaggerated good news and then later ended up misjudging and eventually aggravating the bad news.

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'explosion' in the government debt ratio can no longer be prevented".

[41] Flood, Hodrik, and Kaplan (1994) provide evidence that aggregate share prices in the United States have been too volatile to be explained rationally by movements in market fundamentals. Furthermore, Osler (1995) shows how speculators' horizons and exchange rate dynamics are jointly determined.

[42] Karfakis and Kim's (1995) results indicate that an unexpectedly large current account deficit causes the market to expect foreign exchange market intervention by the Reserve Bank of Australia in an attempt to improve competitiveness. The markets do however factor in the *source* of the larger-than-expected deficit.

Another issue crucial to the sustainability of an external position is that of stability of the domestic socio-political and the legal-institutional framework: fears of political instability in Mexico were an underlying factor in the 1994 crisis; concerns about cronyism surfaced during the East Asian crisis. In the context of current account sustainability, political instability can make domestic and foreign investors more hesitant to invest their capital if they perceive the risk of policy reversal to be significant. The extent of the relevant authority's commitment to upholding and maintaining a particular policy stance will be viewed in light of the perceived credibility of the authorities. A country that commits itself to tight monetary and fiscal policies for example, and maintains this commitment in spite of sustained domestic opposition to the policie, is likely to appear more credible to investors. Because of the possibility of self-fulfilling prophecies, highly visible moves such as large-scale privatisation for example may help to consolidate optimistic expectations (Velasco, 1996). On the other hand, not only are countries with weak governments more likely to suffer from low levels of investment, they may also lack the necessary resources and willpower needed to adjust to external shock.

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CHAPTER 4

South African Current Account Reversals, 1965-1996

The previous chapter offered a non-structural understanding of external sustainability, and in particular, the sustainability of current account deficits. The analysis discussed a number of traditional indicators of external sustainability and showed how these variables can either improve or threaten the sustainability of current account deficits. Despite there being nothing inherently sinister about countries running current account deficits, concerns over the sustainability of these deficits involve the ability of a country to maintain its domestic policies without requiring any drastic shift in these policies. Additional concern is also voiced over the eruption of a situation that could lead to a financial crisis such as an exchange rate collapse leading to debt servicing problems. Any perceived or actual threat to the sustainability of a current account deficit for example may either precipitate a sharp current account reversal, or necessarily require a current account reversal.

The following chapter investigates the determinants of sharp and sustained 'reversals' in South Africa's current account for the period 1965-96. The term 'reversal' is used to indicate either a large reduction in the current account deficit; or a large movement from a deficit to a surplus; or a large increase in the current account surplus. Drawing on the methodology developed by Eichengreen *et al.* (1995), the second part of this chapter introduces a multivariate probit model that examines whether a set of macroeconomic, financial and structural variables can help predict sharp reversals in South Africa's current account. Three sets of results are presented that cover different sets of 'reversals'. The list of explanatory variables used is motivated by the theoretical and empirical research on current account sustainability. The results indicate that reversals in South Africa's current account appear to have been mainly driven by significant improvements in the country's trade balance and its terms of trade (inclusive of gold); economic upswings in the OECD countries; and concerns over the country's level of foreign debt. The results show weak evidence for the effect of the capital account on the current account.

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4.1 Event Study Methodology

The basic idea behind event study methodology is to distinguish between periods of 'turbulence' and the remaining 'tranquil' periods. This form of research methodology has been applied to empirical work on currency crises and also balance of payments crises and allows for the comparison of variables during 'turbulent' periods with their value during 'tranquil' periods. Eichengreen *et al.* (1995) and Frankel and Rose (1996), for example, investigate the causes and consequences of speculative currency attacks by distinguishing between exchange market 'events' and exchange market 'crises'.[43] Here, 'events' refer merely to discrete changes in policy, such as an orderly realignment (devaluation) of the domestic currency without any severe repercussions on the economy. In contrast, exchange market 'crises' necessarily reflect speculative pressures that cause the exchange rate to rapidly depreciate or force the authorities to defend it by radically raising interest rates or expending the country's foreign reserves.[44] Event study analysis has also been applied to movements on the current account (Milesi-Ferretti and Razin, 1997, 1998).[45] These contributions examine whether persistent current account deficits are either likely to end up in a 'crisis' (i.e. a 'reversal') or be reduced without large costs to the domestic economy. Similar to the currency crisis literature, current account 'reversals' can be distinguished from mere 'reductions' in a current account deficit. Insofar as current account 'reversals' occur in periods of significant economic upheaval, one might expect there to be a strong link between currency crises and balance of payments crises. However, this is not necessarily true. While sharp, sustained reductions in a current account imbalance can be associated with large currency depreciations, there are other factors, such as favourable terms of trade developments that may serve to reverse an imbalance on the current account.

4.1.1 Defining Reversals

The definitional criteria for a current account 'reversal' draw mainly on those developed by Milesi-Ferretti and Razin (1997, 1998). Despite South Africa having experienced various fluctuations in its current account, large and persistent changes are able to offer more

[43] Eichengreen *et al.* (1995) examine "currency crises" in 20 industrialised countries, 1959-1993. Frankel and Rose (1996) investigate "currency crashes" in 100 developing countries, 1971-1992.

[44] While these two categories are distinct sets of exchange market turbulence, they are not mutually exclusive. 'Events' may be disorderly, accompanied and provoked by speculative pressure. Also, not all 'crises' necessarily lead to devaluations.

[45] These papers investigate current account 'reversals' for two separate samples of low- and middle-income countries.

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information on the determinants of significant movements in the current account balance than short-term fluctuations. For an improvement in the current account balance to be defined as a 'reversal', three requirements have to be fulfilled:

1. there must be an average reduction (increase) in the current account deficit (surplus) of at least 3 percent over the three quarters after with respect to three quarters before the 'reversal';

2. the maximum deficit during the three quarters after the 'reversal' must be no larger than the minimum deficit in the three quarters preceding the 'reversal'. Conversely, the minimum surplus during the three quarters after the 'reversal' must be larger than the maximum surplus in the three quarters before the 'reversal';

3. the average current account in the three quarters after the 'reversal' must be reduced by at least one-third over the average of the three quarters preceding it.

The first two requirements ensure that only sustained reductions (increases) in the current account deficit (surplus) and not just temporary changes are captured. Although Milesi-Ferretti and Razin (1997, 1998) use the term "reversal" to indicate only a large reduction in a current account deficit, this paper expands the definition to include movements from deficit to surplus, and from surplus to a larger surplus. This is done to develop a broader understanding of the dynamics of South Africa's current account. The third requirement ensures that only large changes in the current account are classified as 'reversals'. This is necessary to avoid counting a reduction in the deficit from 15 percent to 12 percent of GDP, for example, as a 'reversal'. Regarding the amount of the 'improvement' in the current account, the decision is essentially an arbitrary one. Milesi-Ferretti and Razin (1997, 1998) use either (at least) a three- or a five-percentage point reduction in the current account deficit in defining their first necessary condition for a current account 'reversal'. Although their empirical results ultimately use the three-percent reduction, Milesi-Ferretti and Razin (1997, 1998) give no reasons for this. Since increasing the required percentage-point reduction serves to reduce the number of defined 'reversals', and since this paper deals with only one country, it was

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decided that a three-percentage point 'improvement' in the current account balance would suffice.[46]

According to the above three definitions, 'reversals' can occur in consecutive quarters. This poses a potential problem as to the independence of these "adjacent" reversals (Milesi-Ferretti and Razin, 1997, 1998). Although Milesi-Ferretti and Razin (1997, 1998) suggest the exclusion of "adjacent" reversals in empirical analyses, they estimate their probit equations with and without "adjacent" reversals. Following their lead, this approach is taken. It must be stressed here that the exclusion of "adjacent" reversals serves to weaken the predictive power of the econometric analysis. Since binary-choice probit models require that the dependent variable take on the value of either '0' or '1', the assignment of either value contains important information about why a 'reversal' did or did not occur. Furthermore, the exclusion of a defined 'reversal' from a regression equation will have as much of an effect on the relative explanatory power of the variables as the inclusion of that 'reversal'. Another reason for the possible inclusion of "adjacent" reversals relates to the actual independence of the 'reversals'. In their papers, Milesi-Ferretti and Razin's (1997, 1998) first condition for a 'reversal' requires "an average reduction in the current account deficit of at least a three (or five) percent over a period of three years with respect to the three years before the reversal". In light of the dependence between 'reversals', "we exclude reversals occurring within two years of a previous one" (Milesi-Ferretti and Razin, 1998: 10). This, however, does not imply true independence for their defined 'reversals'. To ensure true independence between 'reversals', their first necessary condition would need to exclude 'reversals' occurring within three years of each other.[47] This requirement for true independence between 'reversals' is prohibitively stringent: since this paper uses quarterly data, true independence would require the exclusion of 'reversals' occurring within three quarters before and three quarters after a particular 'reversal'. If this approach were adopted, the number of defined 'reversals' would fall from the original twenty to only eight. Figure 1 illustrates South Africa's current account as a percent of GDP along with the twenty 'reversal' periods (inclusive of "adjacent" reversals), represented by the solid vertical lines.

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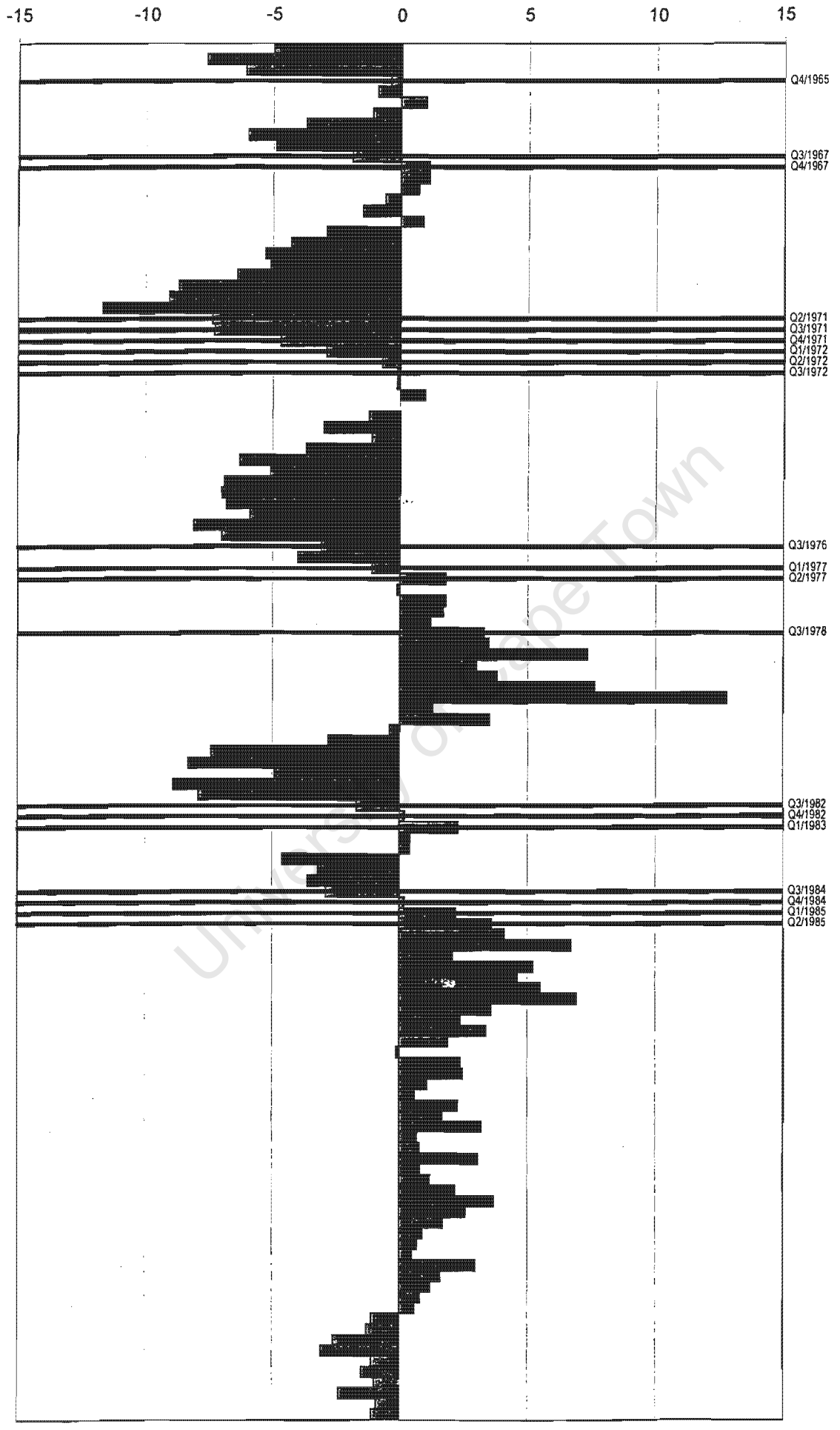
[46] In this paper, increasing the percentage 'improvement' in the current account from three-percent to five-percent reduces the number of 'reversals' from twenty to eight.
[47] Table 1 (Milesi-Feretti and Razin, 1998: 11) does, however, exclude 'reversals' occurring within *three* years of the previous 'reversal'.

Figure 1 Current Account Reversals and the Current Account as a percentage of GDP: 1965-1996



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4.1.2 Explaining Reversals

Although current account 'sustainability' and current account 'reversals' are two distinct issues, they are directly related. Given that a range of factors can threaten the sustainability of a country's current account deficit, any particular external position will be shown to have been unsustainable *ex post* if a country experiences a current account 'reversal'. In light of this relationship, one needs to uncover those factors that 'cause' 'reversals' in a country's current account if a better understanding of current account sustainability is to be had. In this section, a graphical, non-econometric approach to 'explaining' reversals in South Africa's current account is developed. Drawing upon the sections of the previous chapter, potential explanatory variables are assigned to five broad categories. Although some of these variables are not included in the probit analysis due to the non-significance of their estimated coefficients, their potential importance in explaining current account 'reversals' warrants their inclusion here. A full description of the variables and their sources are in Appendix 1.

- **Domestic variables**: gross domestic investment as a percent of GDP; the fiscal balance as a percent of GDP; real private consumption growth; the South African real economic growth rate; real GDP per capita; and imports as a percent of gross domestic expenditure.

- **Financial variables**: the ratio of gross gold and foreign reserves to M2 money; and credit extension to the domestic private sector as a percent of GDP.

- **External variables**: the current account balance as a percent of GDP; the real effective exchange rate; the number of weeks of imports of goods and services covered by gross foreign reserves; the degree of exchange rate overvaluation, calculated as the rate of real exchange rate overvaluation of the rand to the US dollar relative to the sample period average[48]; foreign direct investment (FDI) as a percent of GDP; portfolio flows as a percent of GDP; the capital account as a percent of GDP; gross gold and foreign exchange

[48] As mentioned in section 3.2.3, measuring the extent of any currency misalignment poses a number of empirical problems. Although the *purchasing power parity* approach is widely used, it is problematic. Most important of these problems is the choice of a base year, constant 'equilibrium' exchange rate, which may become an inappropriate measure of the equilibrium in the context of significant regime shifts (Aron, 1997). Given these measurement issues, it was decided to follow Frankel and Rose's (1996) approach to calculating any degree of real misalignment. According to this approach, the rand is overvalued (undervalued) in real terms against the US dollar if it shows a positive (negative) percentage deviation from the sample average.

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reserves as a percent of GDP; and net gold and foreign exchange reserves as a percent of GDP.

- **Debt variables**: public foreign debt as a percent of total public debt; the ratio of total foreign debt to GDP; and the ratio of interest payments to total export earnings.

- **Foreign variables**: the world real interest rate, proxied by the United States real prime interest rate; the real year-on-year growth rate in both the OECD; and the terms of trade index, including gold.

Figure 2 contains information about the behaviour of selected variables during periods of 'turbulence': it shows the average deviation of these variables in each of the three quarters before a 'reversal', at the time of a 'reversal', and in each of the three quarters following a 'reversal'. In order to interpret the graphs, it is necessary to first describe how they are constructed. The data for each of the variables during the sample period are separated into two distinct sets: 'tranquil' and 'non-tranquil' (or 'turbulent'). Each variable's 'non-tranquil' data set contains seven sub-classifications: all three quarters before a reversal (i.e. quarters t-3, t-2 and t-1 respectively); the reversal period itself (t=0); and all the three quarters after the reversal (t+1, t+2 and t+3 respectively). The 'tranquil' data set contains the variable's remaining observations. For every variable, average values are then calculated for all eight of these data set sub-classifications.

The 'tranquil' period average for each variable is then subtracted from each of the seven 'non-tranquil' period averages. These calculations allow for the middle ('dotted') line to be constructed. The two outer bands represent one standard deviation either side of the variable's 'difference from tranquil mean' during each of seven periods described earlier. Since in this paper reversals can occur in consecutive quarters, this means that some 'overlapping' of the 'before' and 'after' periods can occur. Although this may admittedly have some effect on the graphical representation of the variables, the effect is presumed to be only marginal since it occurs relatively infrequently and is, anyway, really only centred around the reversal period between the second quarter of 1971 and the third quarter of 1972.[49] The 'overlaps' have no

[49] Consider a specific period of 'turbulence', Q1/1972 to Q3/1973, for example (see Table 1). Despite Q1/1972, for example, being defined as a 'reversal' in that quarter, it is also the '3 after' observation for the reversal in Q2/1971; the '2 after' observation for the reversal in Q3/1971; the '1 after' observation in the Q4/1971 reversal;

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effect in the probit analysis since the 'tranquil' and 'non-tranquil' sub-classifications are not used there.

The first plot of Figure 2 shows the behaviour of South Africa's current account. Three quarters before a 'reversal', South Africa's current account balance was, on average, almost 6 percent below the 'tranquil' mean of 0.095 percent of GDP. Two quarters before a 'reversal' the current account balance was, on average, about 4 percent below the 'tranquil' mean. If one continues this interpretation of the plot, it should be understood that in periods of 'turbulence', South Africa's current account balance moved from about 6 percent below the tranquil mean (three quarters before a reversal) to 1 percent above the 'tranquil' mean (three quarters after a reversal).

Given that the current account balance represents the difference between domestic saving and domestic investment, in times of current account 'turbulence', South Africa's level of investment (as a percent of GDP) is consistently above its 'tranquil' mean value. Furthermore, it remains relatively constant and shows scant evidence of any specific behavioural pattern in the periods leading up to and after a current account reversal. This observation is contrary to the findings of Milesi-Ferretti and Razin (1997, 1998). They found for their sample of developing countries that declining investment ratios preceded current account reversals.

In the three quarters preceding a reversal, both private real consumption growth and the ratio of imports-to-gross domestic expenditure (GDE) show a steady decline. Real private consumption growth typically falls from about 4 percent three quarters before a reversal to about 1 percent at the time of a reversal. Following a reversal, it begins to show an improvement to about 2 percent three quarters after a reversal, but still approximately 2 percent below it 'pre-reversal' level. The adjacent plot shows the behaviour of imports as a percentage of GDE in periods of 'turbulence'. It shows that imports as a share of GDE move from about 23 percent three quarters before a reversal to about 21 percent at the time of a

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the '1 before' observation for the Q2/1972; and finally, the '2 before' observation for Q3/1972. Much the same argument can be made regarding the other defined reversals during this period.

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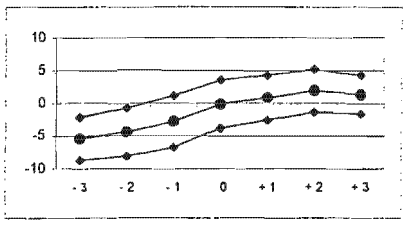
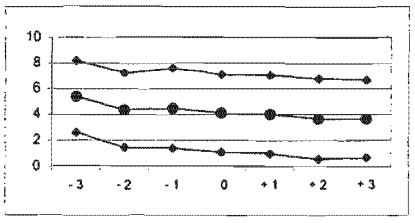
Figure 2 Deviations from Tranquility

Movements 3 Quarters Before and 3 Quarters After Reversals.
Deviation from Tranquil Mean (dotted line) plus One Standard Deviation Band.

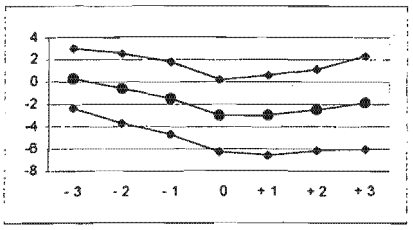
CA: Current Account (%GDP)
Tranquil Average = 0.095%



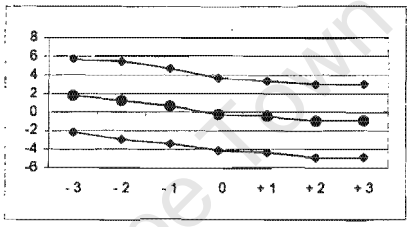
INVEST: Investment (%GDP)
Tranquil Average = 20.78%



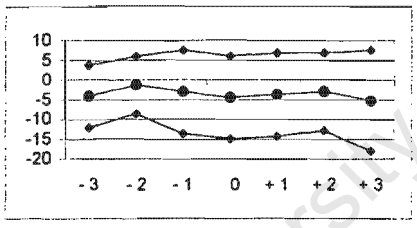
PCONS: Real private consumption growth (%)
Tranquil Average = 4.29%



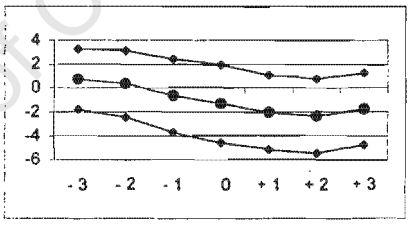
IMPGDE: Imports (% Gross Domestic Expenditure)
Tranquil Average = 21.46%



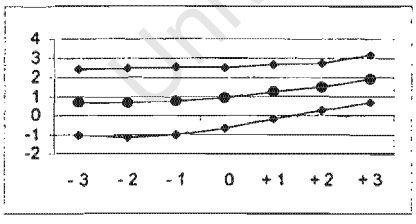
CREDITGDP: Domestic Private Credit Extension (%GDP)
Tranquil Average = 216.31%



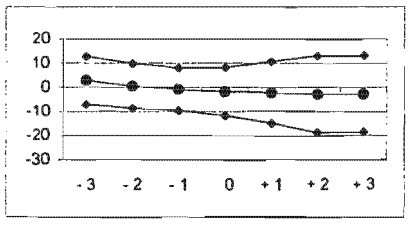
GROW: Real Growth Rate (%)
Tranquil Average = 3.40%



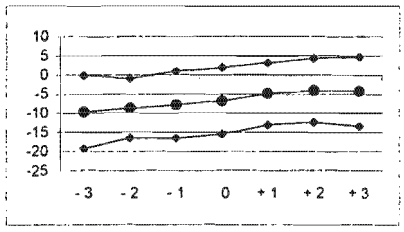
OECD: OECD Real Growth Rate (%)
Tranquil Average = 2.79%



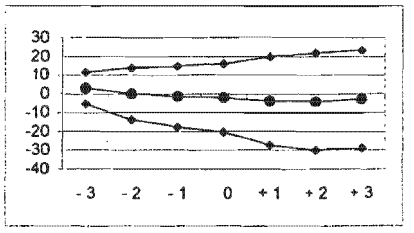
REER: Real Effective Exchange Rate: Index, 1970-1996
Tranquil Average = 100.56



TOTGOLD: Terms of Trade: Index - including gold
Tranquil Average = 103.03



OVERVAL: Rand Overvaluation (%), 1970-1996
Tranquil Average = -0.41%



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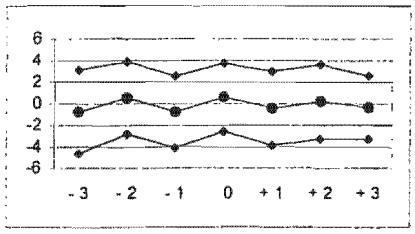
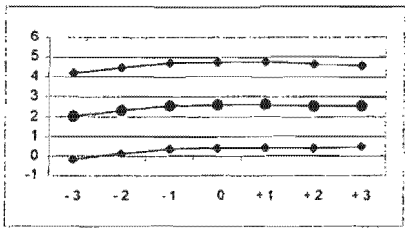
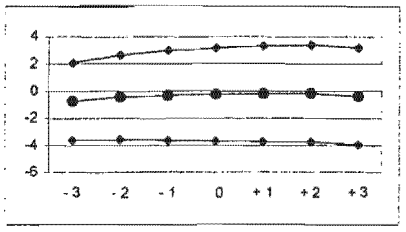
FISC: Fiscal Balance (%GDP)
Tranquil Average = -4.20%



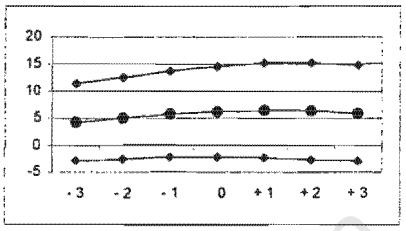
EXTDEBT: Public Foreign Debt (% Total Public Debt)
Tranquil Average = 3.64%



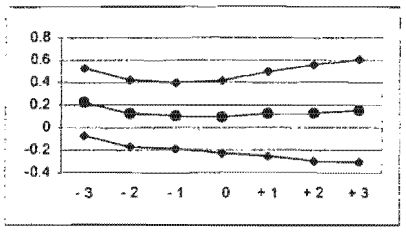
INTEXP: Interest Payments (% Export Earnings)
Tranquil Average = 5.48%



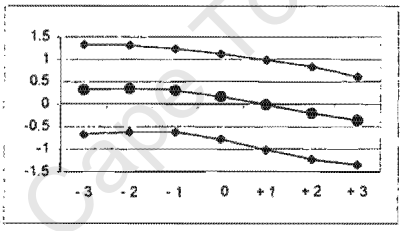
FDEBTGDP: Total Foreign Debt (%GDP)
Tranquil Average = 23.76%



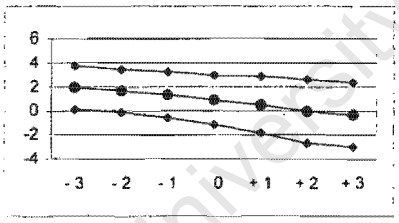
FDI: FDI Flows (%GDP)
Tranquil Average = 0.23%



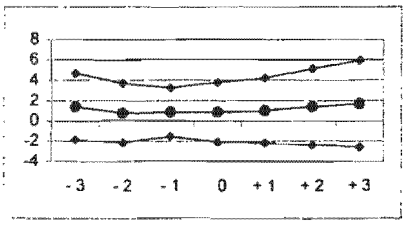
PORTFOLIO: Portfolio Flows (%GDP)
Tranquil Average = 0.29%



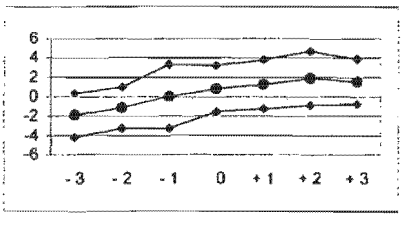
KA: Capital Account (%GDP)
Tranquil Average = 1.26%



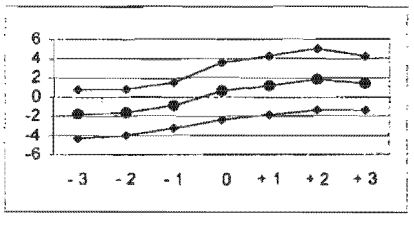
RESM2: Gross Gold and Foreign Reserves (%/M2)
Tranquil Average = 11.28%



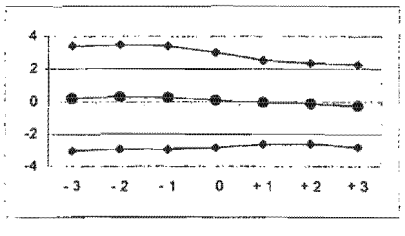
GROSSGOLD
Gross Gold and Foreign Exchange Reserves (%GDP)
Tranquil Average = 0.45%



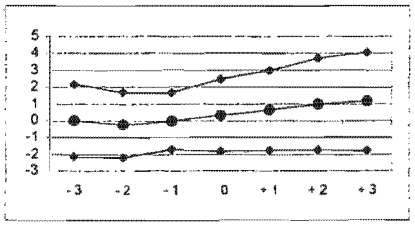
NETGOLD
Net Gold and Foreign Exchange Reserves (%GDP)
Tranquil Average = 0.02%



RINT: US Real Interest Rate (%)
Tranquil Average = 3.71%



RESWEEKS: Imports covered by reserves (Number of Weeks)
Tranquil Average = 7.77 weeks



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reversal. Following a reversal, imports as a percentage of GDE continues to fall, but this decline levels off at approximately 20 percent three quarters after a reversal.

Linked to the movements in the demand for imports and private consumption growth is the extension of credit to the private sector, given the latter's role in shaping movements in consumption and expenditure. Despite remaining consistently below its 'tranquil' mean throughout the period of 'turbulence', private credit extension shows little fluctuation during 'turbulent' periods. Reversals on the current account also appear to be associated with a declining real domestic economic growth rate before a reversal. As Figure 2 shows, South Africa's real economic growth rate fell, on average, from about 4 percent three quarters before a reversal to about 1 percent two quarters following a reversal. Only in the third quarter does it begin to show any sign of improvement. In view of the theoretically ambiguous sign of the relationship between the current account and economic growth, the behaviour of domestic real economic growth appears to mirror the behaviour of the current account. When comparing the plots, the weakening of the current account in the third quarter following a reversal coincides well with the improvement in the domestic real growth rate in the same time period.

Regarding the relationship between changes in foreign economic growth and South Africa's current account, one might expect improvements in the OECD real growth rate to precede a current account reversal through the effect of higher exports. Although the relevant plot indicates that the OECD real growth rate does not appear to rise significantly in the period leading up to a reversal, it does display a marginal improvement in the period following a reversal. Although this may appear to suggest some causal relationship between current account reversals in South Africa and improvements in the OECD growth rate, the more probable scenario is that the two are simply correlated rather than causally linked.

Given the importance of the trade balance within the current account, one might expect current account reversals to be preceded by an overvalued domestic currency or unfavourable terms of trade. The preliminary evidence from Figure 2 suggests that reversals in South Africa's current account have, on average, been preceded by both an unfavourable terms of trade and a marginally overvalued rand relative to the US dollar. In the first instance, South Africa's terms of trade (including gold), while remaining unfavourable throughout the entire

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period of 'turbulence', improved from about 10 index points below the 'tranquil' mean (three quarters before a reversal) to about 5 index points below the 'tranquil' mean (three quarters after a reversal). In the three quarters preceding a reversal, the rand was, on average, overvalued by about 3 percent in real terms against the US dollar. In the subsequent quarters, the rand loses strength against the US dollar and, following a reversal, remains marginally undervalued. When the plot of the rand's real overvaluation against the US dollar is compared with the plot of South Africa's real effective exchange rate, they appear very similar. Although this may be thought to represent the extent to which the rand moves in relative tandem with the currencies of South Africa's other major trading partners, it may be an expected result given the weighting of South Africa's real effective exchange rate.[50]

While current account reversals have empirically been associated with high fiscal deficits and rising levels of (especially short-term) foreign debt held by the public sector, South Africa's experience in this regard appears relatively benign. The fiscal balance does not appear to show any discernible behavioural pattern during periods of 'turbulence'. This may be due to the relatively high degree of variability of the fiscal balance, especially since the mid-1970s. The share of foreign debt in total public debt also fails to render any significant behavioural information in the periods preceding a reversal. Despite remaining consistently above its 'tranquil' mean during periods of 'turbulence', the relative stability of this ratio may, however, be an indication of its low level when compared with similar public sector ratios of other developing countries.

At an aggregate level, the behaviour of South Africa's total (private and public) foreign debt as a percentage of GDP and the country's interest repayments (as a percent of export earnings) render relatively little information. Prior to a reversal, both ratios rise marginally. Following a reversal, however, they decline to approximately the same level three quarters after a reversal than they were three quarters before a reversal. When analysing both these plots, the distortionary impact of the country's debt crisis in 1985 on the figures should be taken into account.[51]

[50] Before 1 January 1999, the South African Reserve Bank's trade-weighted basket consisted of four currencies (weights in brackets): the US dollar (51.7%), pound sterling (20.2%), the German mark (17.2%) and the Japanese yen (10.9%).

[51] The manifestation of the debt crisis in 1985 was due to the decision taken by the South African authorities to halt interest payments on the country's foreign loans. Only after protracted negotiations was a final settlement reached in which South Africa committed itself to resuming the repayment of its foreign debt obligations (Leape, 1991).

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In light of the capital account's role in helping to finance current account deficits, the reduction or outright cessation of foreign flows can trigger a current account 'reversal'. The capital account as a percent of GDP demonstrates a steady decline during the three quarters before a reversal and during the three quarters following a reversal. If the capital account is broken down to reveal just portfolio and foreign direct investment flows as a percent of GDP, the latter appears to fall in the three quarters prior to a reversal and then climbs marginally in the three quarters following a reversal. Portfolio flows, on the other hand, show a slight reduction in the run-up to a reversal, and continue to fall in the three quarters after the reversal. Regarding the latter, mention should be made of the possible 'inflationary' effect on 'tranquil' mean of the almost unabated rise of portfolio flows from the mid-1986 to the end of 1996.

Since current account deficits have to be financed through either capital account surpluses or the expenditure of foreign reserves, the importance of foreign reserves becomes apparent. Although falling stocks of foreign reserves have empirically preceded current account reversals in other developing countries, the preliminary evidence for South Africa suggests otherwise. The plots show that both gross- and net gold and foreign exchange reserves, while remaining below their respective 'tranquil' means three quarters preceding a reversal, rise before a reversal. It is only in the third quarter following a reversal that both variables show signs of weakening.

Linked to a country's foreign reserves and the probability of a current account reversal, is the country's ability to continue importing goods and services, with this ability expressed as the number of weeks of imports covered by the country's level of foreign reserves. Although this indicator can play a potentially important role in signalling a possible current account reversal (if it were to fall to perilously low levels), South Africa's ability to import goods and services does not demonstrate any dramatic behaviour in the period preceding a reversal. Despite this fact, South Africa's ability to import remains significantly lower compared with other countries.[52] Another potentially important indicator of external vulnerability is the ratio of gross foreign reserves to M2 money, because, in the event of an exchange rate crisis or panic,

[52] For the period 1980-1996, South Africa had gross foreign reserves covering about 6 weeks of imports. This does not compare favourably with other developing countries such as Botswana or Singapore, for example, who managed to maintain 56 and 19 weeks respectively (World Development Indicators, World Bank, 1999).

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liquid money assets may be converted into foreign exchange. Although the plot indicates that this ratio falls marginally in the period preceding a reversal, and then begins a mild recovery following a reversal, it remains above its 'tranquil' mean throughout the reversal period. Although no direct comparisons can be made in this particular analysis, South Africa's ratio appears minuscule when compared with the pre-crisis levels seen in some East Asian countries.[53]

The final plot in Figure 2 graphs the movement of the US real prime interest rate during reversals. It appears to offer little help in revealing whether changes in the US real interest rate (as a proxy for the world interest rate), on average, 'caused' any reversals in South Africa's current account. Although the dramatic rise in real interest rates between the third quarter of 1980 and the first quarter of 1981 played a significant role in triggering current account reversals in many developing countries in 1982-1983, evidence for this for South Africa does not appear to be borne out in the plot. A possible reason for this may involve the problems associated with averaging data, especially given negative real interest rates in the US during the mid-1970s and in 1981 in this case.

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4.2 Probit Regression Analysis

In this section a multivariate probit model is used to determine whether a set of macroeconomic, financial and structural variables can help predict 'reversals' in South Africa's current account. This modelling technique falls under the set of statistical models whose dependent variable is discrete in nature and attempts to 'explain' the dependent variable by relating it to the characteristics of a set of explanatory variables. Applying this methodology to the 'causes' of reversals on South Africa's current account, the dependent variable – current account 'reversals' – were assigned one of two values. Based on the criteria developed in section 4.1.1, the dependent variable was assigned a '1' if a 'reversal' occurred in any given quarter, and a '0' if no 'reversal' took place.[54] In the probit analysis, the probability of a reversal occurring is said to be a function of various explanatory variables. Many of these variables are themselves endogenous and should thus be 'explained' by another

[53] By June 1997, Indonesia and South Korea had ratios of M2-to-gross foreign reserves in excess of 600 percent. The Philippines and Thailand were not any better off with their respective ratios just below 500 percent (IMF, 1999:61).

[54] See Appendix II for a brief statistical review of the probit model.

equation. For this reason they are lagged to ensure their 'exogeneity'.[55] In this paper the endogenous variables are lagged two quarters. While the model's results were sensitive to the specific lag structure used, the model's pseudo R^2 was maximised when a two quarter lag was used. The remaining variables – the terms of trade, the OECD real growth rate and the world (US) real interest rate – are not lagged as they are *de facto* exogenous in the case of South Africa.

In light of the accommodating role of the capital account on the overall balance of payments, it is included as an explanatory variable. There exists here, however, a potential statistical problem for the probit analysis. As the sum of current account and the capital account are, by definition, equal to zero, the inclusion of both the current account and the capital account as explanatory variables will create identification problems for the system.[56] Even the inclusion of components of the capital account – foreign direct investment (FDI) flows, portfolio flows, long-term loans, short-term loans and 'other' short-term borrowing – will not solve the identification problem as the sum of these five categories then equals the capital account. This problem was resolved by including the year-on-year percentage change in the disaggregated capital account, expressed as a percent of GDP, in order to prevent linear dependency.

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An additional constraint involves the availability of some explanatory variables only in annual format. Given their potential importance in the model, they are converted from their original format into quarterly data using a quadratic interpolation method.[57] These relevant variables are: the components of the disaggregated capital account; real GDP per capita; and the ratio of foreign debt to export earnings.

Since current account reversals in developing countries have empirically been preceded by an overvalued exchange rate, the model attempted to incorporate South Africa's real effective

[55] I thank Gian-Maria Milesi-Ferretti for this point.
[56] Technically, the sum of the capital account and the current account is equal to the change in foreign reserves. However, these changes are still close enough to zero to create the statistical problems as discussed.
[57] This method fits a local quadratic polynomial for each observation of the low frequency series. It then uses this polynomial to fill in all observations of the high frequency series associated with the period. The quadratic polynomial is formed by taking sets of three adjacent points from the source series and fitting a quadratic so that the average of the high frequency points match to the low frequency data actually observed. For most points, one point before and one point after the period currently being interpolated are used to provide the three points. For end points, the two periods are both taken from the one side where data is available. The resulting interpolation curves are not constrained to be continuous at the boundaries between adjacent periods (*Eviews* User Manual, 1997).

exchange rate and any deviations of the variable from its sample period mean. Firstly, the lack of data for the series before 1970 prevented this. Secondly, even when the sample period for the model was increased to allow for the inclusion of the real effective exchange rate, the probit model was unable to invert the matrix required for estimation. The inflation rate was subsequently used as a partial proxy for the real exchange rate. While the inflation rate did increase the overall 'goodness of fit' of the model, it was not statistically significant at the 10 percent level. The model also investigated whether South Africa's exchange rate regime had played a role in the country's current account reversals.[58] A dummy variable (PEG) was used that took the value '1' if the exchange rate was pegged (or moved within a very narrow band), or '0' otherwise. PEG was not included in the probit model, as it was not found to be statistically or economically significant.

Finally, the same probit equation was estimated using three different definitions of the dependent variable. This was done to compare the results of reversals with varying degrees of dependence, as discussed in section 4.1.1. The first equation has as its dependent variable, Depend1. It contains the full set of twenty defined reversals. Depend2 comprises the full set minus the "adjacent" reversals and contains twelve data points. Depend3 contains only eight reversals: this set excludes any 'reversals' occurring within three quarters before and three quarters after a particular reversal.

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[58] Following the breakdown of the Bretton Woods system, the rand was pegged to the US dollar from August 1971. It was then pegged to sterling and back to the dollar. After a period of 'independent managed floating' the rand was repegged to the dollar in June 1975. Apart from the devaluation against the dollar in September 1975, this peg was maintained until 1978, after which a more flexible exchange rate was adopted (Kahn, 1992).

4.2.1 Results and Discussion

Overall, the probit model identifies a number of "leading indicators" of current account reversals for South Africa. Table 1 contains the results from the regressions. Table 3 and Figure 8 provide the 'goodness of fit' of the probit model for each of the equations under the assumption that a reversal is correctly predicted if the estimated probability is above 0.5.

4.2.1.1 The Current Account

Larger current account deficits are empirically more likely to be associated with a higher probability of a reversal. This is due to the solvency and sustainability considerations that typically come into play when a country runs large and persistent current account deficits. The results for South Africa appear consistent with this notion. The negative sign of the coefficient suggests that the size and relative persistence of these deficits themselves appear to have triggered current account reversals. While the quarterly data suggest that current account deficits have, at times, been large, the annual data suggest that South Africa's current account imbalances have been low by international standards (see Table 2).

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Table 2 Current Account Balances as a percentage of GDP for Selected Countries

	1970-1979	1980-1989	1990-1996
Australia	-1.76	-4.60	-4.41
United States	0.03	-1.89	-1.42
Brazil	-4.19♥	-2.02	-0.81
Chile	-4.44♥	-7.01	-1.80
Venezuela	1.08	1.39	4.42
Mexico	-3.79#	-1.04	-4.04
Indonesia	na	-3.15♦	-2.39
Korea	-2.40	0.01	-1.72
Malaysia	0.51*	-2.87	-5.74
Singapore	-10.89♣	-1.99	12.56
Thailand	-4.93♥	-3.90	-6.94
Czech Republic	na	na	-2.82♠
Hungary	na	-2.19♦	-3.85
Poland	na	-2.52	-1.24
India	-0.23	-2.25	-1.61
Turkey	-2.90♠	-1.64	-0.85
Uganda	na	-5.16	-9.95
South Africa	**-2.15**	**0.89**	**0.43**

Notes: * 1972-1979 ♣ 1974-1979 ♥ 1975-1979 # 1979 ♦ 1982-1989 ♠ 1993-1996
Source: World Development Indicators, World Bank and South African Reserve Bank

Table 1 Indicators of Current Account Reversals

	Depend1	Depend2	Depend3
	Reversals = 20	Reversals = 12	Reversals = 8
CA	-0.418*	-0.011	-0.148
	(0.233)	(0.152)	(0.162)
INVEST	-0.485	-0.009	-0.027
	(0.337)	(0.221)	(0.249)
GDPHEAD	0.002	-0.001	-0.002
	(0.003)	(0.002)	(0.001)
GROW	0.064	0.03	0.037
	(0.074)	(0.062)	(0.065)
OPEN	1.991**	1.167**	0.966**
	(0.195)	(0.547)	(0.490)
TOTGOLD	-0.341*	-0.164	-0.006
	(0.195)	(0.106)	(0.092)
TOTGOLDCNG	0.489*	0.154	0.077
	(0.293)	(0.104)	(0.092)
RINT	0.423	0.297	0.602*
	(0.455)	(0.309)	(0.366)
OECD	1.107*	0.655*	0.290
	(0.579)	(0.380)	(0.326)
RESWEEKS	0.101	-0.072	-0.181
	(0.408)	(0.333)	(0.322)
LONGBORROWCNG	0.003	0.002	0.003
	(0.007)	(0.002)	(0.002)
SHORTBORROWCNG	5.37E-05	-5.69E-04	-8.22E-04
	(0.002)	(0.001)	(8.67E-04)
OTHERSHORTCNG	5.03E-06	-6.39E-04	-8.42E-04
	(2.05E-04)	(4.75E-04)	(5.61E-04)
PORTFOLIOCNG	-1.96E-04	0.001	-0.001
	(6.87E-04)	(0.0013)	(1.43E-03)
FDICNG	-0.002*	-0.001*	-0.001
	(0.001)	(8.43E-04)	(6.80E-04)
FDEBTEXP	0.122**	0.062*	0.0483
	(0.059)	(0.035)	(0.036)
INFLATION	-0.429	-0.323	-0.295
	(0.383)	(0.263)	(0.268)
FISC	0.069	0.191	0.208
	(0.125)	(0.123)	(0.136)
PUBDEBT	-0.592	-0.501	-0.178
	(0.449)	(0.310)	(0.159)
	Pseudo R^2	Pseudo R^2	Pseudo R^2
	0.782	0.576	0.530

Notes: Estimation by probit (standard errors in brackets). Dependent variable takes on the value 1 if a reversal takes place at time *t*, and zero otherwise. **, * indicate statistical significance at the 95% and 90% confidence level respectively. GDPHEAD, LONGBORROW, SHORTBORROW, OTHERSHORT, PORTFOLIO, FDI and FDEBTEXP are converted from annual to quarterly format using a quadratic interpolation method. LONGBORROWCNG, SHORTBORROWCNG, OTHERSHORTCNG, PORTFOLIOCNG, FDICNG and TOTGOLDCNG are year-on-year changes on a quarterly basis.

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4.2.1.2 Investment

Higher levels of investment, *ceteris paribus*, can increase the likelihood of a reversal. They can lead to higher levels of economic growth through increases in exports and savings, and hence enhance the ability to sustain external deficits. While the coefficient it is not significant within the 10 percent range, the sign suggests that reductions (increases) in investment increase (reduce) the probability of a reversal occurring. This may reflect the impact of falling investment hindering the country's ability to generate future trade surpluses or the prospect of lower levels of national saving in the future.

4.2.1.3 Real GDP per Capita

Countries with higher GDP per capita are theoretically more likely to experience reversals (Milesi-Ferretti and Razin, 1998). This is consistent with the theory of stages in the balance of payments where countries during their early stages of development borrow abroad to finance domestic investment projects. As they get richer, the theory suggests that these countries are more likely to experience reductions in their deficits (or shifts to surpluses). While the positive coefficient appears to support this notion, it is not found to be statistically significant at the 10 percent level.

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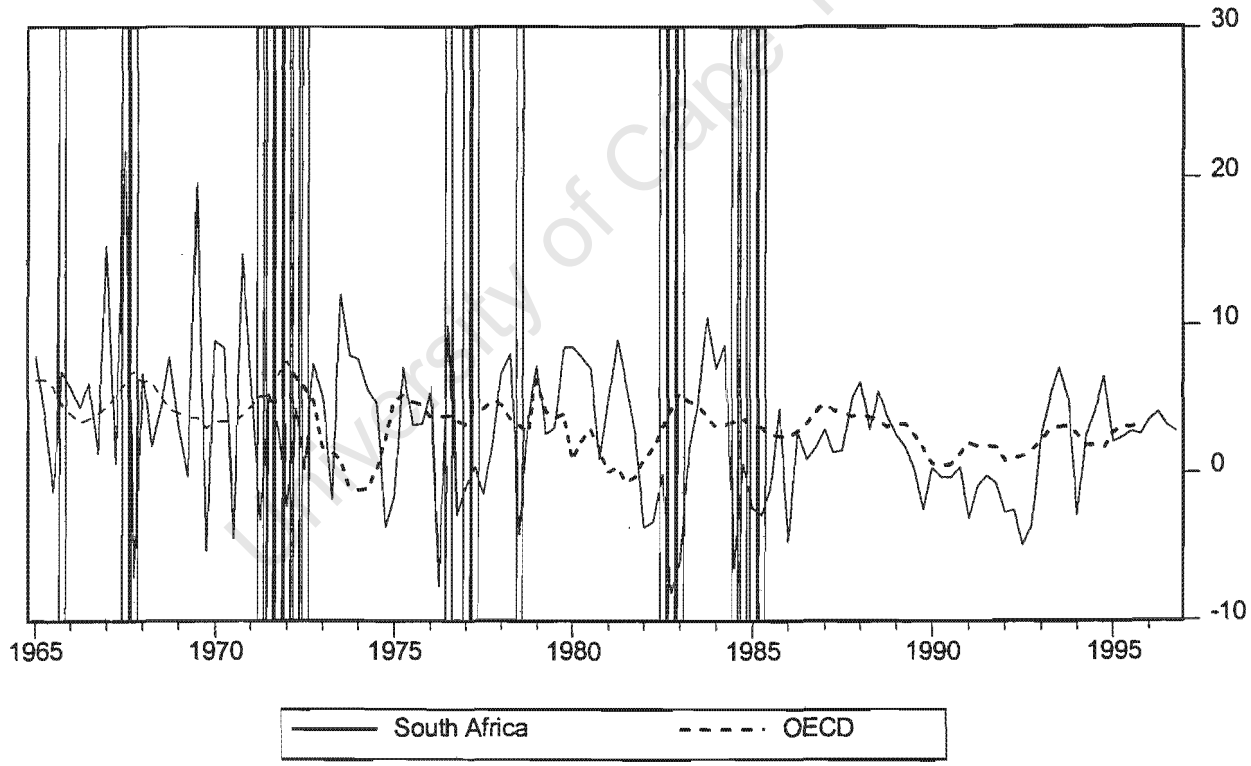
4.2.1.4 Domestic Economic Growth

Countries with higher levels of economic growth are better able to sustain larger and more persistent current account deficits. Higher economic growth can, however, also translate into greater demands for domestic credit, lower savings and higher levels of imports. Expectations of higher incomes in the predictable future can also serve to further weaken the current account through its impact on the trade balance. Conversely, a reduction in domestic economic growth can lead to a fall in the demand for imports, thus increasing the probability of a reversal. While the estimated sign for South Africa's year-on-year quarterly growth rate in real GDP (GROW) indicates a positive relationship (such that increases (declines) in economic growth increase (reduce) the probability of a reversal), real GDP growth is not statistically significant at the 10 percent level.

As Figure 3 shows, the result may involve the highly variable nature of the quarterly real GDP data. An additional consideration involves the very low correlation (-0.05) between the current account balance and real GDP growth. To this extent, the relationship between current account reversals and real economic growth may not be expected to be statistically significant. Despite the lack of significance of real GDP growth in the model, current account reversals have usually been associated with low, and sometimes negative, real growth rates. During the series of reversals of 1971-1972 the real GDP growth rate averaged 1.2 percent. Between the third quarter of 1982 and the first quarter of 1983 South Africa recorded an average real economic growth rate of –4.76 percent. For the set of reversals between the third quarter of 1984 and the second quarter of 1985 the real economic growth rate averaged –2.8 percent.

Figure 3 Real GDP Growth Rates*



* Shaded vertical lines indicate the full set of reversals (including adjacent reversals).

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4.2.1.5 Openness

The more open an economy is to international trade, the less likely it is to experience a reversal. This is consistent with theories of current account sustainability that emphasise how more open economies have a greater incentive not to renege on servicing their external

liabilities and also have a greater capacity to service these external commitments. The results show that South Africa's degree of 'openness' – the *average* share of imports and exports expressed as a percentage of GDP – is statistically significant at the 95 percent level. Contrary to original expectations, the sign of the coefficient is positive, which implies that increases in 'openness' raise the probability of a reversal. The sign of South Africa's 'openness' can be explained, thus revealing the relative importance of international trade to South Africa's balance of payments.

South Africa's dependence on imported technology and its marked tendency towards the capital intensity of production over recent decades have meant that imports have tended to move procyclically. As economic growth and incomes fall, so too does the demand for capital equipment. As Figure 4 shows, current account reversals have consistently been associated with falls in imports. It also shows these reversals have been characterised by rising levels of exports. From this it is clear that current account reversals have been strongly influenced by developments in the country's trade balance.

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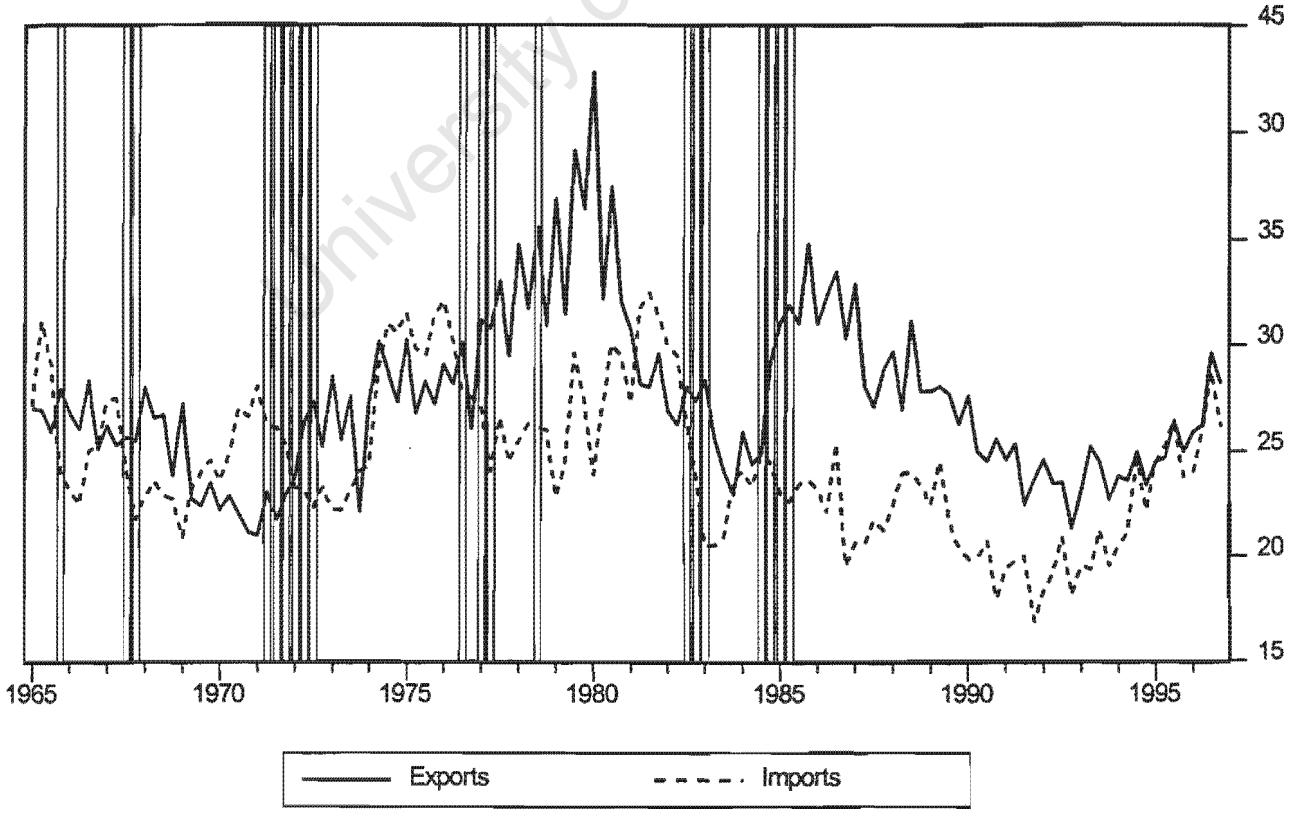
Figure 4 Imports and Exports as a percentage of GDP



4.2.1.6 Terms of Trade

Reversals are more likely when a country's terms of trade weakens. One interpretation of this finding is that countries that experience a deterioration in their terms of trade are more likely to experience a reversal of foreign capital outflows and may thus be forced to adjust their current account deficits accordingly (Milesi-Ferretti and Razin, 1998).

The probit results indicate that South Africa's terms of trade (inclusive of gold) have been a statistically significant factor in current account reversals. The negative sign of the coefficient supports that found by Milesi-Ferretti and Razin (1998). However, Figure 5 shows that reversals on South Africa's current account have generally been associated with an improvement in the country's terms of trade, suggesting a positive coefficient. Despite a negative coefficient for South Africa's terms of trade, quarter-on-quarter changes in the terms of trade yield a positive coefficient that is significant at the 10 percent level. The sign on this coefficient indicates that increases in the index raise the probability of a current account reversal. Not surprisingly, movements in the US dollar price of gold have had an important impact on South Africa's current account through the terms of trade. Significant rises in the dollar gold price have often lead to large reductions in the current account deficit. This is particularly relevant for the sustained rise in the gold price between the end of 1976 and the end of 1979, and again during the 1982-1983 series of reversals (see Figure 5).

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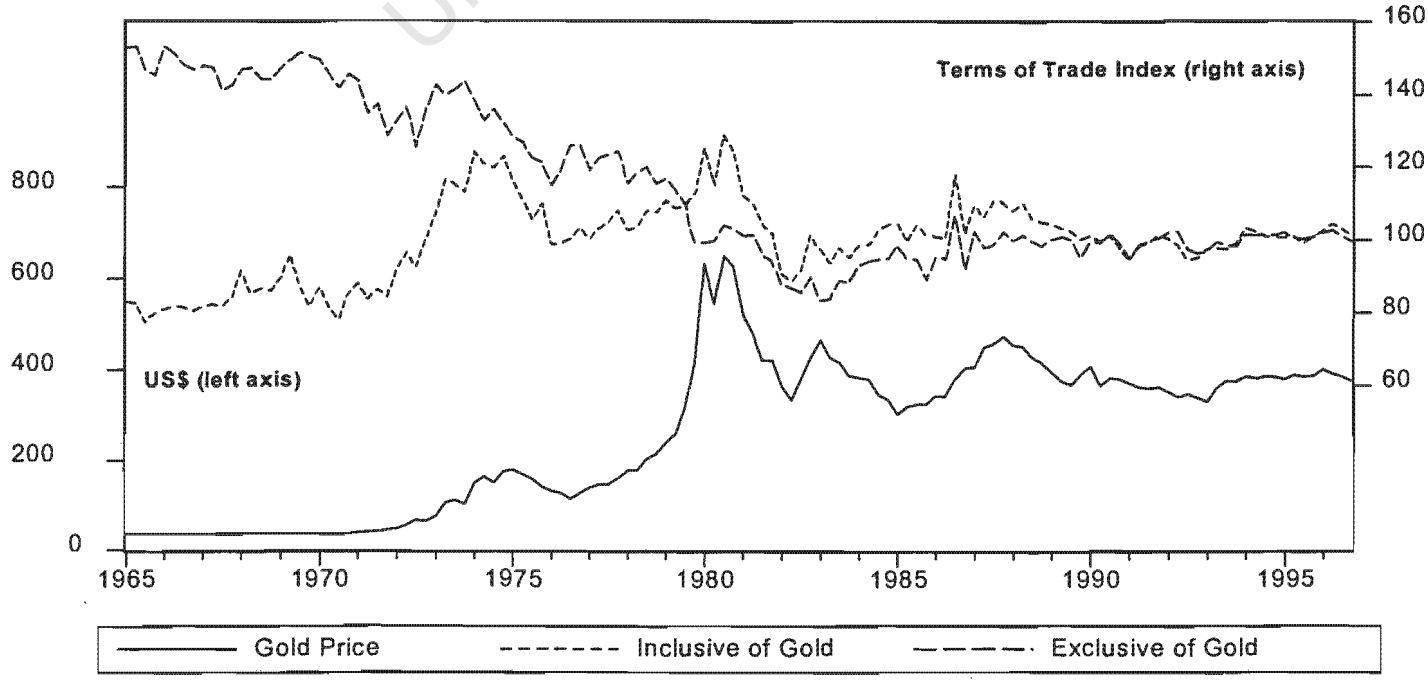
Figure 5 South Africa's Terms of Trade and the US$ Gold Price



4.2.1.7 The Real Interest Rate

Reversals are also more likely when world interest rates are rising. In times of rising interest rates, not only is the current-period cost of borrowing more expensive, international lenders may be less willing to lend if they perceive there to be higher probability of default thus reducing the incentive for foreign capital to flow into the country. For South Africa the real interest rate in the United States is found to be a significant indicator only in the final equation with Depend3. The positive sign on the coefficient indicates that increases in the US real interest rate raise the probability of a current account reversal. This finding for the Depend3 equation is, however, likely to reflect the fewer 'reversal' observations of the dependent variable. As has been already been mentioned, the assignment of either a '1' (a reversal) or a '0' (no reversal) to any particular quarter contains as much information as to why a reversal did or did not occur.

4.2.1.8 Foreign Economic Growth

Countries are more likely to experience current account reversals during times of strong foreign economic growth. Higher demand for imports from the OECD countries, for example, usually serves to strengthen the trade balances of many DET economies. In light of South Africa's historical dependence on primary exports, the results show that the OECD real growth rate is a significant determinant of current account reversals for South Africa. Figure 3 shows that reversals on South Africa's current account have tended to be associated with economic upswings in the OECD economies.

4.2.1.9 Foreign Capital Flows

The results from the model indicate that only changes in FDI flows are statistically significant indicators of current account reversals. The sign of the coefficient suggests that reductions in FDI flows to South Africa raise the probability of a current account reversal. The sign and statistical significance of changes in FDI flows may reflect the relative importance of these longer-term, more permanent capital flows to the future sustainability of South Africa's overall balance of payments. The coefficients for changes in portfolio flows, long-term borrowing, short-term borrowing and 'other' short-term borrowing are not significant at the

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10 percent level. The lack of statistical significance of these flows may reveal their varied behaviour at times of reversals (see Figure 6a,b). Long-term borrowing, for example, does not show any clear pattern at times of current account reversals. The reversals during the 1960s and early 1970s are associated with increases in long-term borrowing. The remaining reversal periods, however, are clearly associated with declines in long-term borrowing. Similar patterns emerge for both short-term borrowing and 'other' short-term borrowing.

South Africa's relatively high propensity to import, combined with its historical dependence on the export of primary commodity-based goods, particularly gold, suggests that developments on the current account have had a decisive effect on the capital account. The sustained rise in the gold price during the latter half of the 1970s suggests evidence of this. South Africa has also undergone major socio-political shocks and a debt crisis, which have led to perceptions that, at least for certain periods, developments on the capital account have driven those on the current account. Major events affecting the capital account include the 1976 Soweto riots, and the debt crisis of 1985, all of which led to significant net foreign capital outflows.

Leape and Khatri (1998) investigate the direction of causality between the capital account and the current account using Granger causality tests for the period 1961 to 1996. While they are unable to establish causality in either direction for the whole period, they conclude there is strong evidence that changes in the capital account Granger "caused" changes in the current account in the 1961-1978 period. In the following period, 1979 to 1984, the causality is reversed and statistically significant. In the periods from 1984 to 1992 and 1985 to 1996, there is no clear evidence at the five percent level of statistical significance. However, there is weaker evidence of causality from the capital account to current account from 1985 to 1996. Their analysis thus presents some evidence that while developments on the capital account have influenced the current account, current account shocks have also had a 'determining' effect on the capital account in the late 1970s and early 1980s.

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Figure 6a Equity Flows to South Africa as a percentage of GDP**

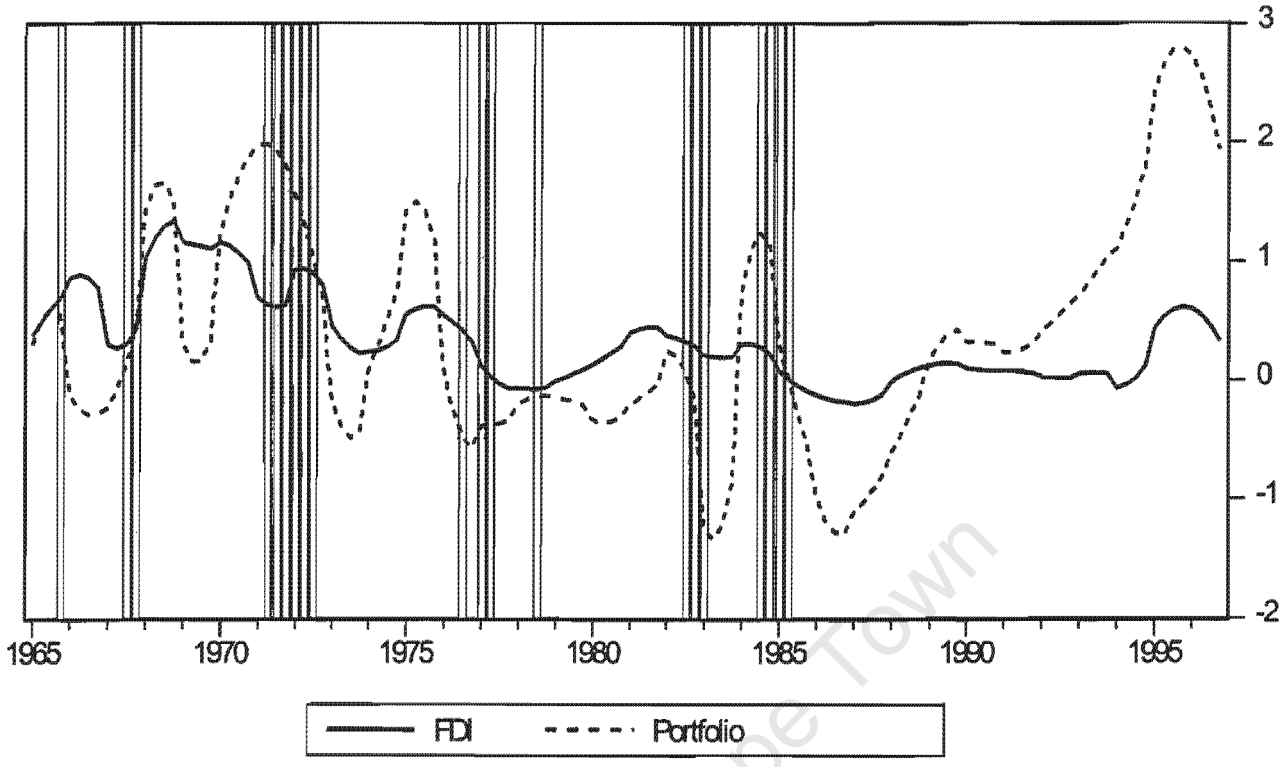
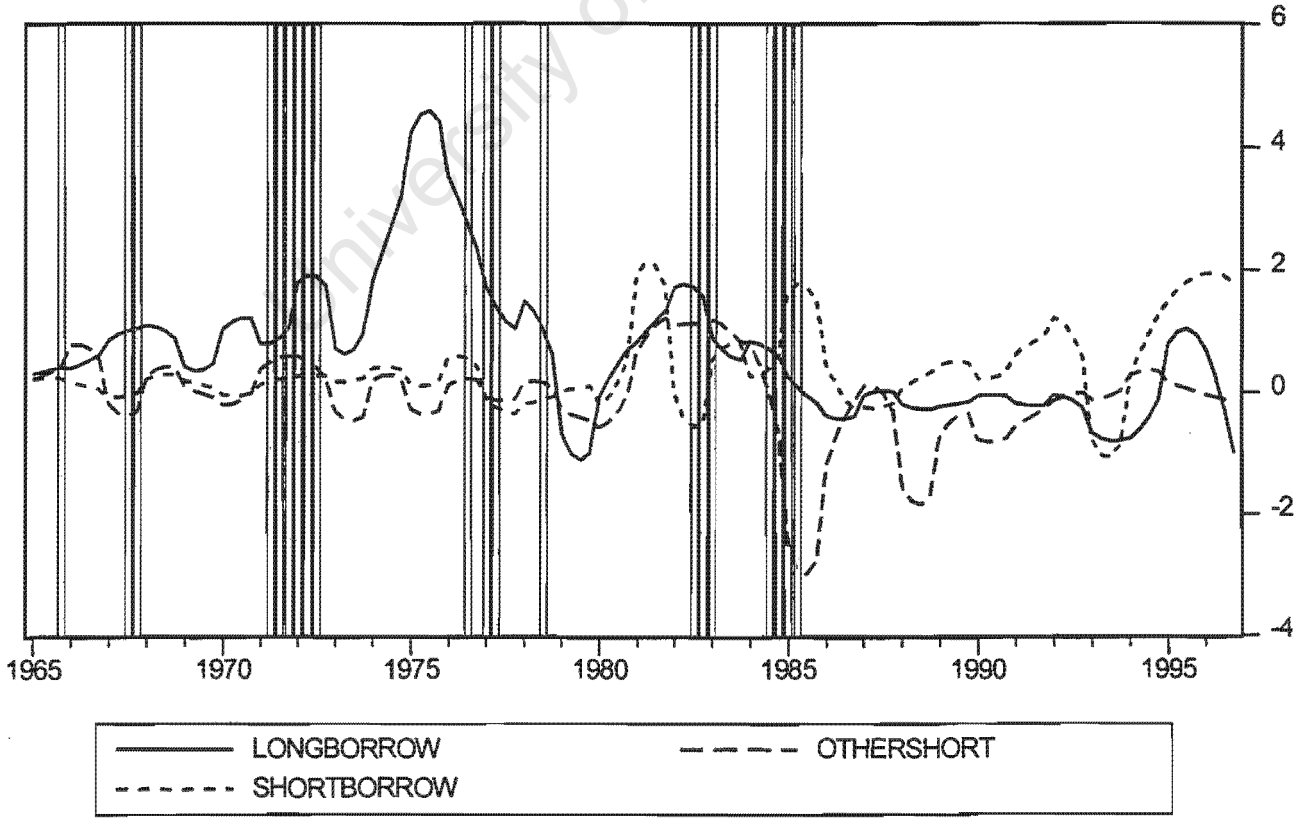


Figure 6b Debt Flows to South Africa as a percentage of GDP**



** Data converted from annual to quarterly frequency using a quadratic interpolation method.

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4.2.1.10 Foreign Debt

While the accumulation of foreign debt has an important role to play in funding a country's development, as well as allowing for the smoothing of consumption during periods of transition, any excessive accumulation of foreign debt, especially short-term debt, is expected to raise the probability of a reversal. The significance of four foreign debt-related variables was tested independently and together in the probit model. Neither the inclusion of public foreign debt as a percentage of total public debt, nor South Africa's total foreign debt as a percentage of GDP increased the predictive power of the model. The inclusion of interest payments on foreign commitments as a percentage of export earnings also did not improve the 'goodness of fit' of the model. This finding may reflect, to some extent, the lack of statistical significance of the US real interest rate on reversals. South Africa's total foreign debt as a percentage of export earnings, however, yielded a highly significant positive coefficient. The statistical significance of this variable is important for two reasons. Firstly, the positive sign is what one expects: increases in foreign debt raise the probability of a reversal. Secondly, the significance of this variable is instructive in that rising levels of foreign debt to export earnings is a better indicator of the relative burden of the debt than the ratio of foreign debt to GDP for example.

As Figure 7 shows, reversals have been associated with periods of increases in total foreign debt. While the two ratios show very similar trends, Figure 7 reveals the dramatic differences between the ratio of foreign debt to export earnings and the ratio of foreign debt to GDP. While these ratios showed very similar percentage increases between 1970-1971 and 1974-1975, the percentage increase in foreign debt to export earnings between 1980 and 1982 and 1980-1985 outstripped the percentage increase of foreign debt-to-GDP ratio. Between the first quarter of 1980 and fourth quarter of 1982, foreign debt as a percentage of export earnings increased 93.78 percent. This figure dwarfs the 37.66 percent increase in foreign debt-to-GDP over the same period.

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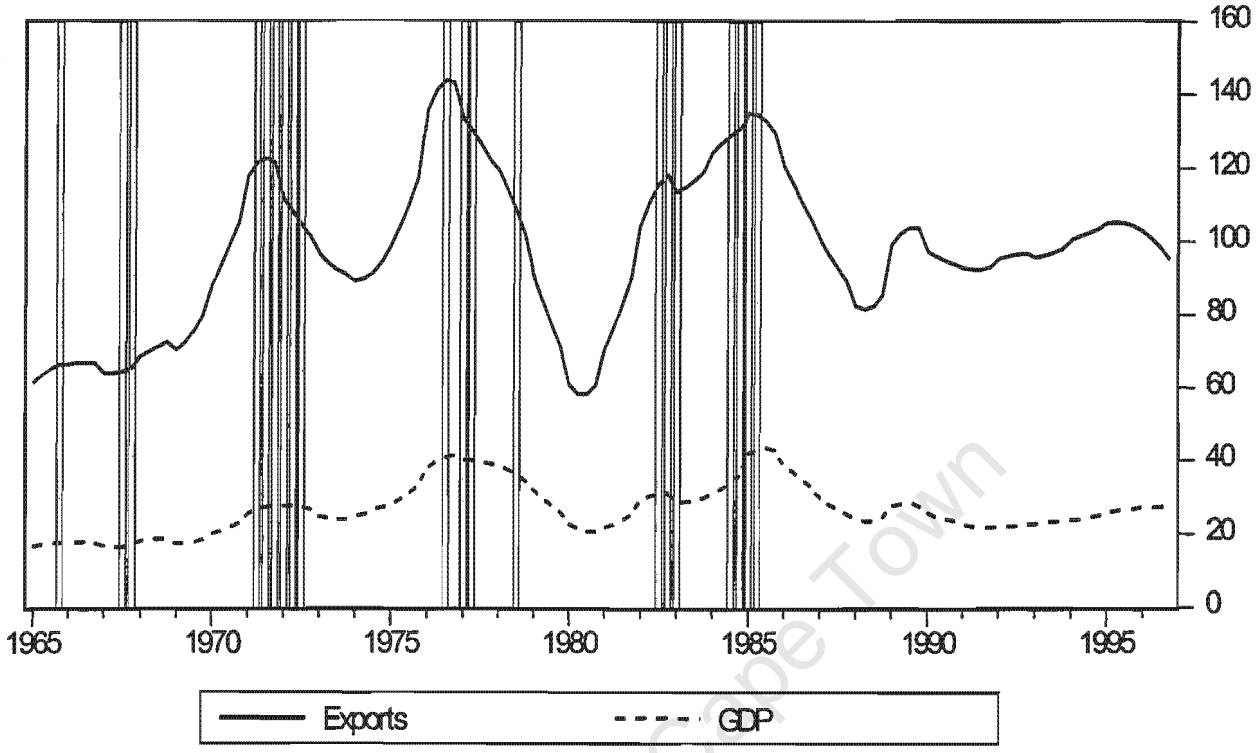
Figure 7 Total Foreign Debt as a percentage of Exports and GDP**



** Data converted from annual to quarterly frequency using a quadratic interpolation method.

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4.2.1.11 Fiscal Balance

The results indicate that higher (lower) fiscal deficits (surpluses) increase the probability of a reversal, which may indicate the importance of fiscal sustainability to local and international investors. However, it does not enter significantly into the model at the 10 percent level.

4.3 Goodness of Fit

While the results from the probit model yield some information about the "leading indicators" of current account reversals for South Africa, little has yet been mentioned about the predictive power of the model. Table 3 displays the number of correct and incorrect classifications based on expected value calculations for the estimated equations. The model generates 'reversal' and 'non-reversal' predictions based on whether the estimated probabilities are, respectively, above or below a cut-off value of 0.5. These predictions are then compared with the actual data.

Table 3 Goodness of Fit

Depend1: Full sample, including adjacent reversals

Estimated Equation

	Actual non-reversal	Actual reversal	Total
Predicted non-reversal	101	3	104
Predicted reversal	3	17	20
TOTAL	**104**	**20**	**124**
% Correct	97.12	85.00	95.16
% Incorrect	2.88	15.00	4.84
Total Gain	-2.88	85.00	11.29
Percent Gain	Na	85.00	70.00

Constant Probability Equation

Non-reversal	Reversal	Total
104	20	124
0	0	0
104	**20**	**124**
100.00	0.00	83.87
0.00	100.00	16.13

Depend2: Full sample, excluding adjacent reversals

Estimated Equation

	Actual non-reversal	Actual reversal	Total
Predicted non-reversal	110	5	115
Predicted reversal	2	7	9
TOTAL	**112**	**12**	**124**
% Correct	98.21	58.33	94.35
% Incorrect	1.79	41.67	5.65
Total Gain	-1.79	58.33	4.03
Percent Gain	Na	58.33	41.67

Constant Probability Equation

Non-reversal	Reversal	Total
112	12	124
0	0	0
112	**12**	**124**
100.00	0.00	90.32
0.00	100.00	9.68

Depend3: Full sample, excluding reversals occurring three quarters after a reversal

Estimated Equation

	Actual non-reversal	Actual reversal	Total
Predicted non-reversal	114	4	118
Predicted reversal	2	4	6
TOTAL	**116**	**8**	**124**
% Correct	98.28	50.00	95.16
% Incorrect	1.72	50.00	4.84
Total Gain	-1.72	50.00	1.61
Percent Gain	na	50.00	25.00

Constant Probability Equation

Non-reversal	Reversal	Total
116	8	124
0	0	0
116	**8**	**124**
100.00	0.00	93.55
0.00	100.00	6.45

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As Table 3 shows, the *specificity* of the model (the number of non-reversals correctly predicted) for all three equations is high. This may be expected given the relatively large number of predicted non-reversals compared with the number of predicted reversals. For the Depend1 equation, of the 104 defined non-reversals, the model correctly predicts 101 (or 97.12 percent) of them. Three reversals are incorrectly predicted to have been non-reversals. For the equations with dependent variable Depend2 and Depend3, the number of correctly predicted non-reversals increases to 98.21 percent and 98.28 percent, respectively. Despite these impressive results, a more revealing test of the predictive power of the model is the number of reversals correctly predicted, otherwise known as the *sensitivity* of the model. Across the three equations the correct number of defined reversals falls as the number of defined reversals declines. For the equation with the full set of reversals, seventeen of the twenty reversals (or 85 percent) were correctly predicted. Overall, the Depend1 equation correctly predicted 95.16 percent of the observations. The remaining equations with Depend2 and Depend3 correctly predicted 94.35 percent and 95.16 percent of the observations, respectively.

A constant probability model (shown on the right-hand side of Table 3) estimates the overall 'goodness of fit' of an equation by predicting that *all* data points of the dependent variable are *non-reversals*. This is because more than fifty percent of the observations were non-reversals in the first instance. As the constant probability equation for Depend1 illustrates, there are 104 correctly predicted non-reversals and 20 incorrectly predicted non-reversals (i.e. the 20 actual reversals). Overall, the constant probability equation correctly predicts 83.87 percent of the model. The "pseudo tests" of the model's predictive ability are provided by the change in 'explanatory power' when the estimated equation, rather than the constant probability equation, is used (*Eviews* User Manual, 1997). The two measures – "Total Gain" and "Percent Gain" – are shown at the bottom of the Estimated Equation sub-table.

The "Total Gain" shows the absolute percentage increase between the total of the model correctly predicted by the estimated equation (95.16 percent) and the total of the model correctly predicted by the constant probability equation (83.87 percent). For Depend1, the estimated equation is 11.29 percentage points better at predicting reversals than the constant probability model. "Percent Gain" measures the gain of the estimated equation over the constant probability model of the percentage reduction of incorrect observations in the model.

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As Table 3 shows, the estimated Depend1 equation incorrectly predicted 4.84 percent of the model. This represents a 70 percent improvement over the 16.13 percent incorrectly predicted reversals in the constant probability model. For the equations with Depend2 and Depend3 as dependent variables, this percentage gain in the number of correctly predicted reversals falls to 41.67 percent and 25 percent, respectively. Figure 8 contains a graphical representation of the fitted probabilities for the reversals for each of the equations.

While this may indicate that the Depend1 equation is a better "model" of reversals in South Africa's current account, this is more a statistical feature of the different equations. Since the constant probability equation automatically classifies *all* reversals as non-reversals, one expects the movement from the constant probability equation to the estimated equation to show a smaller percentage gain as the number of predicted reversals falls. The percentage of incorrectly predicted reversals will subsequently fall. Therefore, when the two equations are compared, the estimated Depend1 equation will show a greater percentage improvement over its constant probability equivalent.

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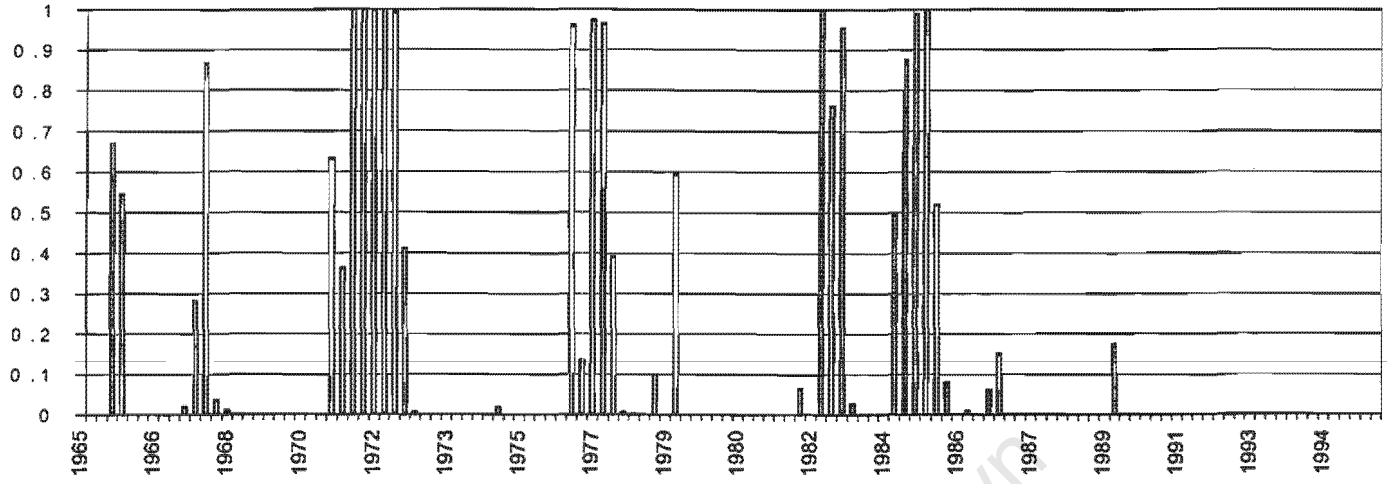
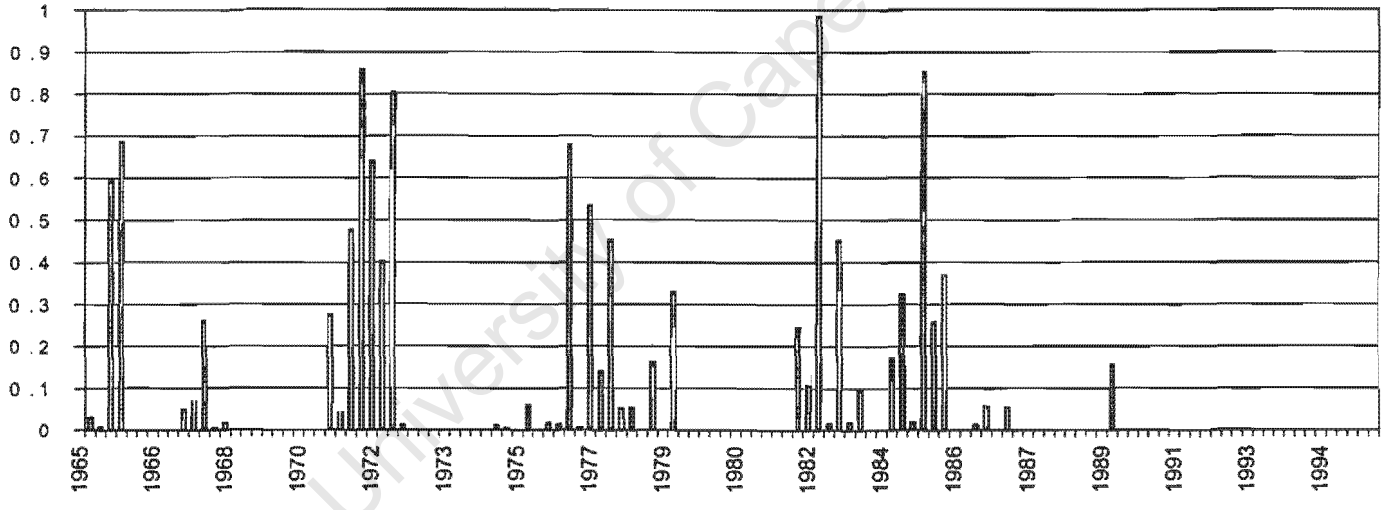
Figure 8 Fitted Probabilities of Reversals

Depend1



Depend2



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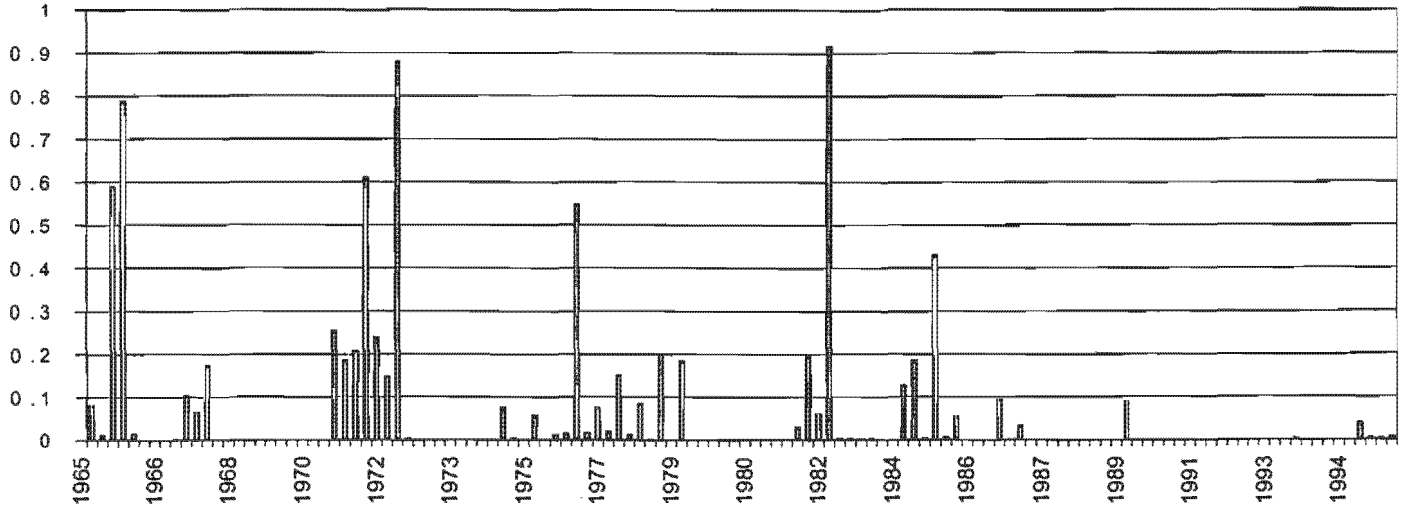
Depend3



CHAPTER 5

Future Current Account Sustainability

The peaceful political transition in April 1994 marked a shift in perceptions of current account sustainability. The prospect of a more stable socio-political environment that began with multi-party negotiations in 1992 improved both domestic and foreign perceptions of the South African economy. Since 1994, foreign capital has continued to flow to South Africa, with the period 1994 to 1998 recording an average net inflow of around two percent of GDP. In light of these recent developments, what can be said about the sustainability of future current account deficits? In order to begin to answer this complex question, one needs to understand both the structural constraints and recent changes to the South African economy.

5.1 Savings

One of the most important and often cited structural weaknesses of the South African economy is its low level of domestic savings. This can have serious implications for the achievement of investment-driven growth in the medium-term as the economy has to rely on foreign savings to fund domestic investment. Since 1990, South Africa's domestic saving-to-GDP ratio has fallen considerably, averaging 16.9 percent for the 1990-1998 period, compared with 24.6 percent in the 1980s and 25.5 percent in the 1970s. In 1998, gross domestic saving amounted to just 14.2 percent of GDP.

This general downward trend in domestic savings is, perhaps, one of the most urgent macroeconomic policy issues facing South Africa. While the corporate sector has been the mainstay of gross domestic saving in South Africa, the trend in household saving and government saving has raised concern amongst policy makers. During the 1980s the household sector maintained a relatively constant percentage of savings, averaging 2.4 percent of GDP. This ratio has continued to fall, and in 1998, household saving amounted to 0.3 percent of GDP. Possible reasons for the downward decline include, amongst others, falling real disposable incomes and slow income growth, and the rapid rise in credit-financed consumer spending. A more serious consideration for the South African economy, however, has been the trend in government saving. Having averaged 3.2 percent of GDP between 1970-

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1979, government saving as a proportion of GDP fell significantly during the 1980s. In 1984, the South African government recorded gross dissaving of 1.1 percent of GDP. Dissaving peaked in 1993 at 6.2 percent but has since been reduced to 3.1 percent of GDP in 1998.

One of the key issues facing domestic policy makers thus concerns how to raise the national savings rate. Improving government saving implies a reduction in government consumption expenditure, in favour of government investment spending, while maintaining revenues. Particular attention should also be given to raising private and especially household savings.

As was shown in the previous chapter, South Africa's current account has typically been influenced by adverse movements in its terms of trade and cyclical changes in economic growth rates of its major trading partners. As with many other developing countries, the implication is that unfavourable developments on world markets, for example a sustained fall in the dollar price of gold in the case of South Africa, will have a negative impact on the current account. Since current account deficits have to be financed either through the depletion of the country's foreign reserves or by an inflow on the capital account, the capital account can thus play an accommodating role in the overall balance of payments, provided foreigners remain willing lenders. Given South Africa's low and declining level of domestic savings, it is clear that the crucial issue for the sustainability of future current account deficits hinges on the sustainability of foreign capital inflows.

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5.2 Capital Flows

The fundamental changes to South Africa's domestic political environment during the 1990s resulted in a change of investor sentiment. The growing foreign interest in emerging markets has prompted the South African financial sector to embark on a range of reforms aimed at improving the quality and sophistication of the domestic financial system in order to attract foreign capital inflows. These changes, along with the gradual liberalisation of exchange controls, are important factors influencing increased international participation in South African financial markets. They have also had significant implications for monetary and exchange rate policies and the regulatory framework, with government facing considerable challenges in managing the impact of large and often volatile capital flows on the economy.

At the same time, government has sought to increase the transparency of policy, especially with respect to exchange rate intervention.

In 1996, South Africa's levels of short-term to total foreign debt compared favourably with countries such as Mexico, Malaysia and Columbia. Since then, this ratio has risen considerably. Between 1996 and 1998 South Africa has experienced further increases in short-term debt, with foreign currency-denominated short-term debt reaching 46.3 percent of the total in 1998. While it may be inappropriate to interpret this ratio as an indication of possible problems in short-term debt servicing, a more appropriate measure is the ratio of short-term foreign debt to export earnings or foreign reserves. Since 1996, South Africa's short-term foreign debt relative to export earnings has also increased. Again, while South Africa's short-term foreign debt to export earnings does not appear comparatively excessive, the continuous rise in the ratio since 1994 should be carefully observed.

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5.3 The Economic Policy Framework

During the 1990s South Africa has taken concrete steps towards addressing the structural problems constraining future growth of the economy. While measures aimed at improving future growth prospects can potentially increase the amount of resources available to meet external obligations, they can also enhance domestic creditworthiness in the eyes of foreign investors, at least in the short to medium-term. Also important are measures that enhance the robustness of the financial system, which the Asian crisis has shown to be a critical determinant of vulnerability to balance of payments crises. Although South Africa's resilience in the face of capital outflows in recent years has been due, in part, to the strength of financial supervision and regulation, continued attention in this policy area remains a priority.

Some of the more significant changes to the South African economy have been the various structural and institutional reforms and improved macroeconomic policies since 1994. Foremost of these reforms was the introduction of the government's *Growth Employment and Redistribution* (GEAR) strategy in June 1996 that provides an overarching framework for economic policy. The main aim of the strategy has been the achievement of rapid and sustainable growth, job creation, and the reduction in social inequality through targeted

spending on the poorest. While the strategy has been criticised for a number of reasons, GEAR has identified important areas for reform. From the standpoint of current account sustainability, the most important of these are trade policy, exchange rate policy, and monetary and fiscal policy.

5.3.1 Trade Policy

One of the more significant changes has been the realignment of the real economy towards a more outward-oriented industrialisation strategy. Until the early 1990s, South Africa's trade policy was guided by three inter-related strategies: import-substituting industrialisation; the development of strategic industries (in coal, arms and oil); and the development of mainly mineral-related exports through upstream beneficiation. The resulting trade regime was complex, highly discretionary and strongly biased against manufactured exports.

Since the mid-1990s, South Africa has made considerable progress in rationalising its complex tariff regime and in lowering the overall level of nominal and effective protection. This change in orientation has reduced incentives for import-substituting activity and encouraged manufactured exports. South Africa has continued to open its borders to global commerce under the terms of its agreement with the World Trade Organisation.

In the period from 1993 to 1997, exports of merchandise goods rose significantly, with the contribution of exports to GDP increasing from 23.4 percent in 1994 to 27.8 percent in 1997. The focus on the manufacturing sector as a source of future growth has seen the fall in the importance of the gold mining sector. Despite gold's continued role in the domestic economy, there has been a general trend towards export diversification, especially in the manufacturing sector, with non-traditional exports such as motor vehicles and components and plastic products showing strong growth (Black and Kahn, 1998).

5.3.2 Exchange Rate Policy

The magnitude and speed of capital flows to and from South Africa over the past few years have highlighted the need for appropriate management of exchange rate policy as well as the foreign exchange reserves. Following a period of exchange rate support for the South African

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gold mining industry between 1979 and 1988, the Reserve Bank moved towards maintaining a stable real exchange rate (Kahn, 1992). The underlying rationale has been to minimise the effects of temporary influences, such as short-term capital flows, on domestic savings and investment decisions. It has been suggested, however, that an aggressive policy towards maintaining the real exchange rate at a particular level is likely to be inappropriate in the context of structural changes to the domestic economy (Leape and Khatri, 1998). Policy must therefore strike a balance between responding to temporary factors and allowing adjustment to long-run changes in the economy.

The Reserve Bank's commitment to maintaining the "internal" and "external" value of the rand has meant that it has had to decide when and how to intervene in the foreign exchange markets. It has also had to take into account the different – and sometimes conflicting – objectives of its intervention strategies. In addition to maintaining a stable real exchange rate, other objectives of exchange rate policy are to increase the level of foreign reserves and to prevent inflationary pressures. The potential for conflict between these objectives is demonstrated by the experience of 1995 and early 1996. Substantial intervention took place during 1995 in order to prevent excessive appreciation of the rand to the point where it was argued that further intervention would unacceptably compromise the objective of reducing inflation. But in limiting further intervention, the authorities risked compromising the objectives of maintaining the external value of the rand and of increasing foreign reserves.
The Reserve Bank actively intervenes in both the spot and forward foreign exchange markets, but predominantly in the forward market. By the end of December 1998, the Reserve Bank's total net oversold position (its net forward position less its net holdings of spot gold and foreign exchange reserves) amounted to US$22.5bn; net reserves of the Reserve Bank equalled around US$2.3bn. The Reserve Bank's decision to publish monthly statistics on its net oversold forward position and its total net open position has signalled an important step towards increased transparency of Reserve Bank policy and operations. During the period of rand instability in 1996 and, especially, during the Asia crisis, a lack of transparency concerning the Reserve Bank's forward position was cited as a key factor undermining investor confidence.

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5.3.3 Monetary and Fiscal Policy

A further significant change to the South African economy over the past few years has been the fundamental restructuring of monetary policy. These developments have been precipitated by an increasingly liberalised and globalised financial system. In March 1998, the Reserve Bank introduced the repurchase (or "repo") system to ensure that short-term interest rates provide an accurate reflection of underlying money market liquidity.

Fiscal policy has also undergone radical transformation. Fiscal management reform has been undertaken to bring the country's budgeting process in line with international standards and practice. Moves to broaden the tax base, improve the efficiency of tax collection, speed up the privatisation process, the abolition of some taxes and a reduction in others, have gone a long way towards developing a more transparent and efficient system of fiscal policy.

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CHAPTER 6

Conclusion

The recent episodes of external instability in Mexico in 1994-1995, and more recently in East Asia in 1997, have stimulated new theoretical and empirical research into balance of payments crises. These new directions have attempted to provide a conceptual framework that helps understand these often very severe events, and have been directed towards improving policy design so as to reduce the possibility of future balance of payments turmoil.

Economic theory suggests that intertemporal borrowing and lending are important instruments for the achievement of capital accumulation, a more efficient allocation of investment, and the smoothing of consumption. While these benefits are well known, large and persistent current account deficits are often viewed as a sign of potential of weakness. As recent empirical evidence has shown, even if the allocation of saving and investment appear sound *ex ante*, unforeseen shocks – a currency crisis, a sharp deterioration in the terms of trade, or contagion effects – may show that external position to be unsustainable *ex post*.

This paper examined a range of macroeconomic indicators that have been found to be instructive in assessing the sustainability of current account deficits. Notwithstanding exogenous shocks such as adverse terms of trade movements, these indicators highlighted the importance of consistent and responsible domestic macroeconomic policies and a sound, well-regulated domestic financial sector so as to minimise undue pressure on the overall balance of payments. Given the recent spate of financial and currency market upheavals, the accumulation of foreign liabilities has also highlighted the importance of an appropriate policy framework, not only with respect to the maturity profile of the foreign debt, but also for exchange rate and related policies to effectively manage the impact of capital flows.

Drawing on the analysis of these sustainability indicators, a multivariate probit model of current account reversals for South Africa was estimated. Based on the recent empirical work, the purpose of the modelling procedure was to uncover a set of "leading indicators" behind a set of sharp and persistent reductions in South Africa's current account between 1965 and 1996. Although the evidence from developing countries shows that current account reversals

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are more likely to occur in countries that have persistent current account deficits, that have overvalued exchange rates, falling foreign reserves and increasing levels of especially short-term foreign debt, the results for South Africa show that the country's current account reversals have been influenced mainly by changes in the external macroeconomic environment. These include increases in the OECD economic growth rate, improvements in the country's terms of trade through rises in the dollar gold price, and increasing levels of foreign debt. Linked to changes in the domestic and OECD real growth rates, South Africa's openness to international trade has also had a significant effect on current account reversals. Reversal periods have typically been associated with rising levels of exports and falling levels of imports. While developments on the capital account might be expected to have had an important impact on the current account, this was not borne out well in the regression results. FDI flows, however, were found to be a statistically significant indicator of current account reversals over the sample period.

Regarding the sustainability of future current account imbalances, South Africa has taken important steps towards minimising the macroeconomic impact of future balance of payments shocks. The successful transition to a democratic system of government in 1994 signalled the prospect of a more stable macroeconomic environment, along with improved access to and increased creditworthiness in international debt and capital markets. Other fundamental changes to the economy include the implementation of the government's GEAR strategy; the commitment by the fiscal and monetary authorities to pursuing more sustainable macroeconomic policies; and the considerable progress made in rationalising the country's trade regime and lowering the overall level of protection. Along with the on-going liberalisation of the capital account, these factors imply a more efficient use of resources, together with a commitment to improving the longer-term growth potential of the economy.

Despite the potential of these factors to strengthen the trade balance, South Africa looks set to remain dependent on foreign savings to accommodate its resource gap. Given the recent spate of financial and currency market upheavals, the accumulation of foreign liabilities highlights the importance of an appropriate policy framework not only with respect to the maturity profile of foreign debt, but also for exchange rate and related policies to effectively manage the impact of capital flows.

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Appendix I

Data Sources and Definitions

CA:	Current Account Balance as a percent of GDP. Source: South African Reserve Bank (SARB).
CREDITGDP:	Domestic private credit extension as a percent of GDP. Own calculations based on SARB data.
EXTDEBT:	Foreign public debt as a percent of total public debt. Own calculations based on SARB data.
FDEBTEXP:	Total foreign debt as a percent of export earnings. Source: SARB data. Database.
FDEBTGDP:	Total foreign debt as a percent of GDP. Source: SARB data.
FDI:	Foreign direct investment as a percent of GDP. Annual data converted to quarterly data. Source: SARB.
FISC:	Fiscal Balance as a percentage of GDP. Source: SARB.
GDPHEAD:	Real GDP per capita, constant 1990 Rands. Source: SARB.
GROSSGOLD:	Gross gold and foreign exchange reserves as a percentage of GDP. Source: SARB.
GROW:	Real GDP growth, quarterly at an annual rate. Own calculations based on SARB data.
INTEXP:	Interest payments as a percent of export earnings. Source: SARB data.
INVEST:	Gross Domestic Fixed Investment as a percent of GDP. Source: SARB.
KA:	Capital Account Balance as a percentage of GDP. Own calculations based on the sum of LONGBORROW, SHORTBORROW, OTHERSHORT, PORTFOLIO, and FDI. Annual data converted to quarterly data.
LONGBORROW:	Long-term loans as a percent of GDP. Annual data converted to quarterly data. Source: SARB.
NETGOLD:	Net gold and foreign exchange reserves as a percentage of GDP. Source: SARB.
OECD:	Real OECD growth rate, quarterly at an annual rate. Source: Centre for Research into Finance and Economics in Southern Africa (CREFSA), London School of Economics.
OPEN:	Average share of exports and imports of goods and services as a percent of GDP. Own calculations based on SARB data.
OTHERSHORT:	Short-term borrowing by public authorities, public corporations and the private sector – expressed as a percent of GDP. Annual data converted to quarterly data. Source: SARB.
OVERVAL:	Real exchange rate overvaluation of the Rand to the US dollar. Own calculations based on SARB data.
PEG:	Dummy variable taking the value of 1 if the exchange rate is fixed or fluctuates within a narrow band, and 0 otherwise.
PORTFOLIO:	Portfolio investment (equity and debt instruments) – expressed as a percent of GDP. Annual data converted to quarterly data. Source: SARB.
PUBDEBT:	Government debt as a percent of GDP. Source: SARB.

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REER: Real Effective Exchange Rate Index (period average = 100). Own calculations based on SARB data.

RESM2: Gross foreign reserves as a percentage of M2 money. Own calculations based on SARB data.

RESWEEKS: Imports of goods and services covered by foreign reserves, expressed as a number of weeks. Source: SARB.

RINT: United States real interest rate. Own calculations based on International Financial Statistics.

SHORTBORROW: Short-term borrowing by 'other' banking institutions – expressed as a percentage of GDP. Annual data converted to quarterly data. Source: SARB.

TOTGOLD: Terms of Trade Index (including gold), period average = 100. Own calculations based on SARB data.

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Appendix II

Statistical models with discrete dependent variables typically represent the dependent variable, y_i, as a dummy variable that takes the value '1' if the 'event' occurs and '0' if it does not. These specialised statistical models allow researchers to 'explain' why an event does or not occur based on a probability density function.

Following Griffiths *et al.* (1993), let P_i be the probability that in quarter '*i*' a reversal ('1') occurs and $(1 - P_i)$ be the probability that no reversal occurs ('0'). In this 'event' situation the probability density function of y_i is

$$(1.1) \quad g(y_i) = P_i^{y_i}(1-P_i)^{1-y_i} \quad y_i = 1, 0$$

For the discrete random variable, y_i, the resulting probability density function yields the *probability* of each of the alternatives. Therefore, given equation (1.1) the probability function of a current account 'reversal' occurring is

$$(1.2) \quad g(1) = P_i \{y_i = 1\} = P_i$$

and the probability of no reversal occurring is

$$(1.3) \quad g(0) = P_i \{y_i = 0\} = 1 - P_i$$

The mean and variance of the dependent variable, y_i, are:

$$(1.4a) \quad E\{y_i\} = P_i$$

$$(1.4b) \quad \text{var}(y_i) = P(1 - P_i)$$

The probability distribution of y_i is completely determined by P_i, which is the probability of a reversal occurring, and which is also the expected value of y_i. Since we are interested in 'explaining' the variation in y_i, we need to 'explain' the probability P_i (the probability that a

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reversal occurs in the i^{th} quarter) by relating it to the characteristics of alternatives of the independent variables.

The probit model is a *non-linear* (in the parameters) statistical model that achieves the objective of relating the choice probability P_i to explanatory factors in such a way that the probability remains in the {0, 1} interval. Using vector notation, the "reversal index" for the i^{th} quarter can be defined as:

$$(1.5) \qquad R_i = x_i' \beta$$

As the explanatory variables x_{ik} change, the value of the index R_i also varies. The larger the value of R_i, the greater will be P_i, the probability of there being a reversal in the i^{th} quarter. Since the probability of a reversal must lie between zero and one, the cumulative distribution function ensures that P falls between zero and one through a monotonic relationship between the "reversal index", R, and P. This yields the probit specification that represents the reversal probability as:

$$(1.6) \qquad P_i = F(R_i) = F(\beta_1 + \beta_2 x_{i2} + \ldots + \beta_K x_{iK}) = F(x_i' \beta)$$

where $F(R_i)$ is the cumulative distribution function of the standard normal $N(0, 1)$ random variable evaluated at R.

Unlike linear models, the estimated parameter values β_{ik} in the probit model cannot be directly interpreted as the effect of a change in an explanatory variable on the expected value of the variable. This is due to the effect of the standard normal probability density function, such that:

$$(1.7) \qquad \frac{\partial P_i}{\partial x_{ik}} = f(x_i' \beta) \cdot \beta_k$$

From Equation (1.7), it can be seen that since the value of the probability density function is *always* positive, the *sign* of β_k indicates the direction of the relationship between the explanatory variable and the probability P_i. Firstly, if $\beta_k > 0$ then an increase in x_{ik} increases

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the probability that $y_i = 1$. If $\beta_k < 0$, an increase in x_{ik} reduces the probability that $y_i = 1$. Secondly, the magnitude of the change in the probability, given a change in x_{ik}, is determined by the magnitude of β_k *and* the magnitude of $f(x_i' \beta)$.

In estimating the unknown parameters β, the probit model uses the method of maximum likelihood estimation because of the discrete nature of the outcome variable, and the non-linear, in the parameters, functional relationship between the choice probability P_i and the explanatory variables x_k. Maximum likelihood estimation is based on the fact that the *joint probability density function* of the sample of *T independent* observations is the product of the T probability density functions $g(y_i)$. Since the β is unknown, the idea of maximum likelihood estimation is to choose, as estimates of β, the values of β that maximise the probability of obtaining the sample that is actually observed. The resulting maximum likelihood estimates of the probit model are obtained by considering the joint probability density function to be a function of the unknown parameters β, assuming that the sample outcomes y_i and x_i are known.

The estimated parameters of the probit model can also be used to "predict" whether or not a reversal occurs. The estimated probability is calculated from the probability model in equation(1.6), with the maximum likelihood estimates of the parameters replacing the true β values.

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