

**FOR  
AGENDA**

SM/07/267

July 18, 2007

To: Members of the Executive Board

From: The Secretary

Subject: **South Africa—Selected Issues**

This paper provides background information to the staff report on the 2007 Article IV consultation discussions with South Africa (SM/07/250, 7/12/07), which is tentatively scheduled for discussion on **Wednesday, July 25, 2007**. At the time of circulation of this paper to the Board, the Secretary's Department has not received a communication from the authorities of South Africa indicating whether or not they consent to the Fund's publication of this paper; such communication may be received after the authorities have had an opportunity to read the paper.

Questions may be referred to Mr. Lizondo (ext. 38650), Mr. Cuevas (ext. 34523), and Mr. Gueorguiev (ext. 30024) in AFR.

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# INTERNATIONAL MONETARY FUND

## SOUTH AFRICA

### Selected Issues

Prepared by a staff team consisting of Saul Lizondo (head),  
Alfredo Cuevas, Robert Burgess, Nikolay Gueorguiev, Charles Yartey (all AFR),  
Jerome Vacher (MCM), and Mwanza Nkusu (PDR)

Approved by African Department

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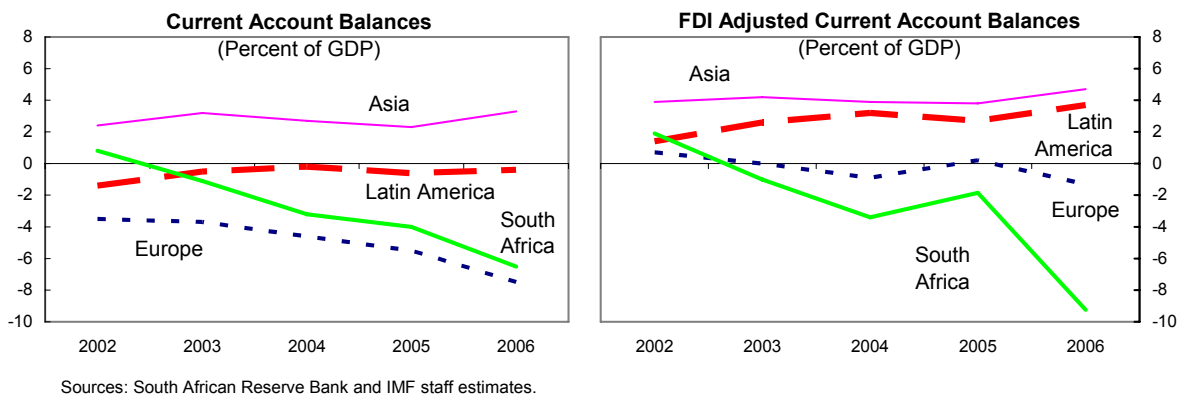
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## I. ASSESSING THE RISKS FROM SOUTH AFRICA'S CURRENT ACCOUNT DEFICIT<sup>1</sup>

### A. Introduction

1. In recent years, South Africa's current account balance has swung sharply, from a small surplus in 2002 to a deficit of 6½ percent of GDP in 2006. The deficit now exceeds thresholds sometimes considered as worrisome.<sup>2</sup> The deterioration has come at a time when the current account positions of many other emerging market economies, except those in Europe, have been improving. South Africa is also unusually reliant on portfolio equity inflows to finance its deficit, whereas European emerging markets attract significant foreign direct investment flows (Figure I.1).

Figure I.1. Emerging Markets. Current Account Balances



2. Some believe large and persistent current account deficits are automatically a cause for concern. Fischer (1988) considers them a sign of future danger. Countries with large current account deficits may be on a path to insolvency, building up unsustainable levels of foreign debt and raising the prospect of default or an abrupt reversal of capital flows that would demand costly and painful adjustment. Even if there were no solvency concerns, large deficits can leave a country vulnerable to liquidity difficulties arising from adverse external shocks, such as changes in the international financing environment. According to this view, policy intervention to reduce the deficit, for example through fiscal or monetary tightening to increase national savings and reduce demand, is therefore necessary.

<sup>1</sup> Prepared by Robert Burgess and Mwanza Nkusu.

<sup>2</sup> Summers (1996), for example, argued that close attention should be paid to any current account deficit in excess of 5 percent of GDP, particularly if it is financed in a way that could lead to rapid reversals. However, the threshold at which the current account balance leads to a significant increase in the probability of a crisis is likely to vary according to country circumstances.

3. **An alternative view is that, if markets are efficient, a current account deficit simply reflects the optimal decisions of borrowers and lenders** (Sachs, 1981). This is thought to be more likely when a current account deficit is a reflection of private saving and investment decisions rather than a fiscal imbalance (Corden, 1994). The theory is that, if the deficit does not reflect a market distortion, policy intervention will not only be unnecessary but also damaging (welfare-reducing).

4. **These two views are not necessarily inconsistent: the reality tends to lie somewhere between them.** Some countries have been able to run large current account deficits over many years without precipitating any kind of crisis. Australia, for example, has run a current account deficit averaging 4½ percent of GDP a year since 1980. And there are many examples of current account deficits that reflect private sector imbalances being abruptly and painfully reversed, as in Korea, Indonesia, and Thailand in the mid-1990s, despite seemingly robust economies.

5. **To what extent should South Africa's current account deficit be viewed as a cause for concern?** Section B presents some defining features of the South African deficit: what has driven it and how it has been financed. Section C provides a more formal assessment of the sustainability of the current account under various assumptions. Section D discusses the risks associated with a reversal of capital flows and a forced adjustment of the current account. Section E concludes by discussing the policy implications of the analysis.

#### **B. Some Defining Features of South Africa's Current Account Deficit**

6. **The increase in South Africa's current account deficit from 2002 through 2006 was driven primarily by a deterioration in the trade balance (Table I.1).** This partly reflects a long-term decline in gold exports but largely a decline in the balance of trade in other merchandise. The balance on income and services has been more or less constant at a combined deficit of some 2½–3 percent of GDP. Current transfer payments abroad have increased in recent years, reflecting South Africa's payments to its partners in the Southern African Customs Union (SACU), and explain about half a percentage point of GDP of the current account balance deterioration since 2002.

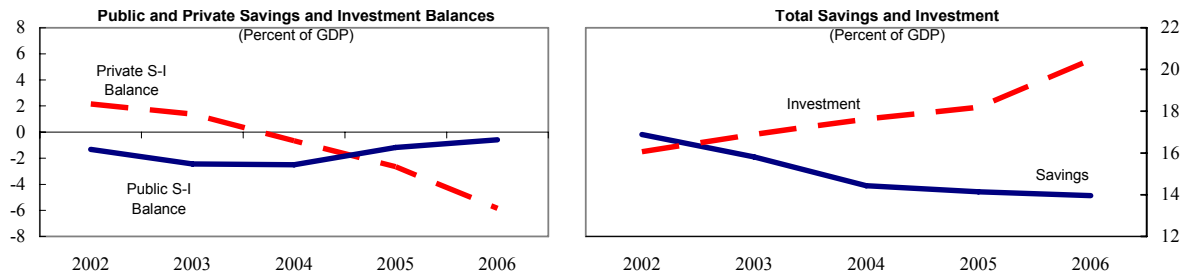
Table I.1. South African Current Account, 1980–2006 (Percent of GDP)

	Merchandise Trade excluding Gold	Net Gold	Services Trade	Income Balance	Current Transfers	Current Account
1980-84	-8.1	11.3	-1.2	-4.1	-0.1	-2.1
1985-89	-2.0	10.4	-0.8	-3.8	-0.2	3.5
1990-94	-0.7	5.4	-0.8	-2.4	-0.4	1.2
1995-99	-1.7	3.6	-0.5	-2.2	-0.5	-1.3
2000-03	0.5	3.0	-0.3	-2.7	-0.6	-0.1
2004-06	-3.0	2.0	-0.5	-2.0	-1.0	-4.6
2006	-4.5	2.1	-0.9	-2.1	-1.1	-6.5

Source: South African Reserve Bank.

7. **The widening deficit is a private sector phenomenon resulting from both a rise in investment and a decline in savings** (Figure I.2). Though the imbalance between public sector savings and investment has narrowed in recent years, the private sector imbalance has widened sharply. The latter reflects both a decline in savings and, increasingly, rising investment.

Figure I.2. South Africa: Savings and Investment Positions and the Current Account Balance



Source: IMF staff estimates.

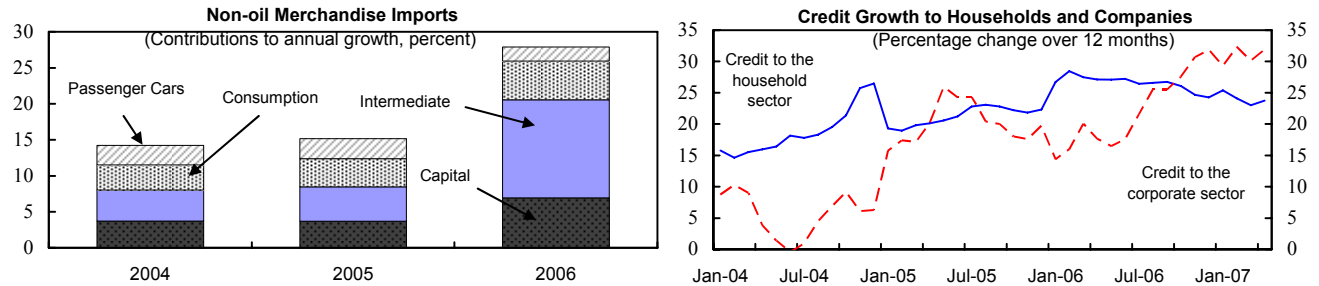
8. **An analysis of the composition of imports suggests that demand for both consumption and capital goods has contributed to the recent surge in imports, although the largest contribution comes from intermediate goods.** In 2006, intermediate goods accounted for half the increase in non-oil imports. Consumer goods and passengers cars combined and capital goods each accounted for one quarter (Figure I.2).<sup>3</sup> Credit growth provides a further indication of the relative balance of demand between consumption and

<sup>3</sup> The analysis is based on the UN Broad Economic Classification of goods, but excludes fuels and lubricants. Capital goods are used as a means of producing other goods and services. Intermediate goods are transformed or used up in the production of goods and services. Consumption goods are used by households. Passenger cars are typically regarded as dual-use (they can be owned by businesses or households) and hence are shown separately.



investment. The increase in corporate borrowing over the past two years suggests that pattern of demand has become more evenly distributed.

Figure I.3. Measures of the Pattern of Demand



Sources: UN Comtrade, South African Reserve Bank, IMF staff calculations.

9. **The deterioration in the trade balance does not reflect movements in the terms of trade.** South Africa's terms of trade have improved by about 10 percent since 2002. Higher prices for key export commodities (gold, platinum, and coal) and a decline in prices for some merchandise imports have more than offset the impact of higher oil prices. The first-round impact of changes in the terms of trade for 2002–06 is shown in Table I.2. For example, the trade balance would be about 1.5 percent of GDP better if oil prices reverted to their 2002 levels. The worsening in the trade balance has been driven largely by an increase in the volume of non-oil imports.

Table I.2. Impact of Changes in Terms of Trade on External Balance, 2002–06  
(percent of GDP except where stated)

	(Percent change, 2002-2006)		Trade Flows (Percent of GDP)			
			Actual (2006)	Impact on Trade Flows of Changes in: <sup>1</sup>		
	Rand Prices	Volumes		Prices (1)	Volumes (2)	Combined (3)
Non-gold exports	12.5	22.3	23.1	2.6	4.2	6.3
Gold exports	25.2	-35.1	2.1	0.4	-1.1	-0.5
Non-oil imports	-5.6	133.8	-23.7	1.4	-13.6	-9.1
Oil imports	65.5	33.4	-3.9	-1.5	-1.0	-2.1
<b>Trade Balance</b>	...	...	<b>-2.5</b>	<b>2.9</b>	<b>-11.5</b>	<b>-5.4</b>

Source: IMF staff estimates.

<sup>1</sup> Shows impact on actual 2006 trade flows resulting from changes in: (1) prices with respect to 2002 levels; (2) volumes with respect to 2002 levels; and (3) prices and volumes with respect to 2002 levels.

10. **The widening current account deficit has been financed to a large extent by portfolio equity flows** (Table I.3). Errors and omissions have also made a substantial positive contributions to the balance of payments in recent years. By emerging market standards, FDI has been relatively small. It has been driven by a few large mergers and acquisitions and private equity transactions, which tend to be more volatile than traditional “greenfield” FDI. Net inflows were reduced in 2006 by substantial outward direct investment by South African companies. Portfolio equity inflows, on the other hand, account for an

unusually large share of financing flows compared with other emerging markets (Figure I.3). Bond flows have typically been small but increased substantially in 2006.

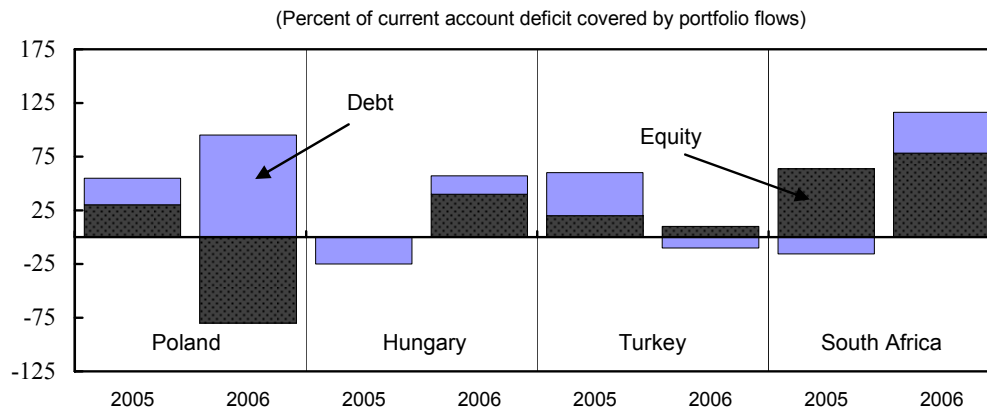
Table I.3. South Africa: Current Account Financing 2002–06  
(Percent of GDP)

	2002	2003	2004	2005	2006
Current account	0.8	-1.1	-3.2	-4.0	-6.5
Direct investment	1.0	0.1	-0.3	2.2	-2.7
Outward investment	0.4	-0.3	-0.6	-0.4	-2.6
Inward investment	0.7	0.4	0.4	2.6	-0.1
Portfolio investment	-0.4	0.5	2.9	1.9	7.6
Equity	-0.8	0.4	2.7	2.6	5.1
Debt	0.5	0.1	0.3	-0.6	2.5
Other investment	-0.3	-1.8	0.6	0.6	1.1
Errors and omissions	0.2	1.8	2.6	1.6	2.3
Reserve accumulation <sup>1</sup>	-1.4	0.4	-2.7	-2.2	-1.7

Source: South African Reserve Bank.

<sup>1</sup> Change in reserves due to balance of payments transactions (negative number denotes increase in reserves)

Figure I.4. Emerging Market Reliance on Portfolio Financing Flows



Sources: South African Reserve Bank and Deutsche Bank Global Market Research.

### C. Current Account Sustainability

11. **Should South Africa's current account deficit be considered unsustainable or abnormal?** This section considers two approaches to an answer. The first seeks to identify the level of the current account balance that would be consistent with some measure of external solvency or sustainability. The second considers the relationship between the current account balance and various fundamental factors thought to be important in determining it. The latter approach provides an indication of whether a particular current account balance

might be considered normal in the sense that it would be in line with current account balances in countries with similar economic characteristics.

## External Sustainability

12. **The external sustainability approach is based on the notion of satisfying an intertemporal budget constraint, specifically that the present value of future trade surpluses must be sufficient to pay for the country's external liabilities.** One simple way to ensure that this condition holds is to stabilize the level of net foreign assets (NFA) relative to the size of the economy. To determine the level of the current account balance that stabilizes NFA at a given level, the method uses an accumulation equation for NFA, which states that changes in NFA are due either to net financial flows (net purchases of foreign assets minus net foreign purchases of domestic assets) or to changes in the valuation of outstanding foreign assets and liabilities. In its most simple form, the relationship is as follows:<sup>4</sup>

$$\text{NFA stabilizing current account balance} = \text{GDP growth} / (1 + \text{GDP growth}) * \text{target or benchmark NFA level}$$

13. **The relationship implies that faster-growing economies can afford to run larger current account deficits without increasing the ratio of their external liabilities to GDP.** The current account balance consistent with stabilizing the ratio of NFA to GDP is also proportional to the targeted level or chosen benchmark for NFA. Clearly, the NFA benchmark level is a key element in assessing the current account balance. However, the choice of benchmark is to some extent arbitrary. It may reflect a variety of considerations. On the one hand, low external exposure is likely to be associated with reduced risk of external crises or disruption. On the other, access to more foreign capital may be associated with increased growth.

14. **The current account balances that would stabilize the NFA position under alternative assumptions for economic growth are shown in Table I.4.** For example, assuming real GDP growth of 4.5 percent, a current account deficit of 1.1 percent of GDP would stabilize NFA at the end of 2005 level of -13 percent of GDP. Growth of 6.0 percent would be consistent with a marginally wider deficit of 1.3 percent of GDP. However, there is no particular reason why the benchmark for NFA should be set equal to the 2005 level. As an illustration, with GDP growth of 4.5 percent, a current account deficit of 2.8 percent would stabilize NFA at -34 percent of GDP—about the average for emerging market economies

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<sup>4</sup> This simplified version of the relationship assumes that net financial flows are simply the mirror of the current account balance (i.e., there are no capital transfers or errors and omissions). It also abstracts from changes in exchange rates and asset prices, as well as relative rates of return on assets and liabilities. See IMF (2007), Box 3.1, for a brief summary of the relationship between these factors and NFA positions. While these factors, (continued...)

(Figure I.5). Alternatively, and using the same 4.5 percent GDP growth assumption, a current account deficit at last year's level of 6.5 percent of GDP would stabilize the NFA position at -77 percent of GDP.

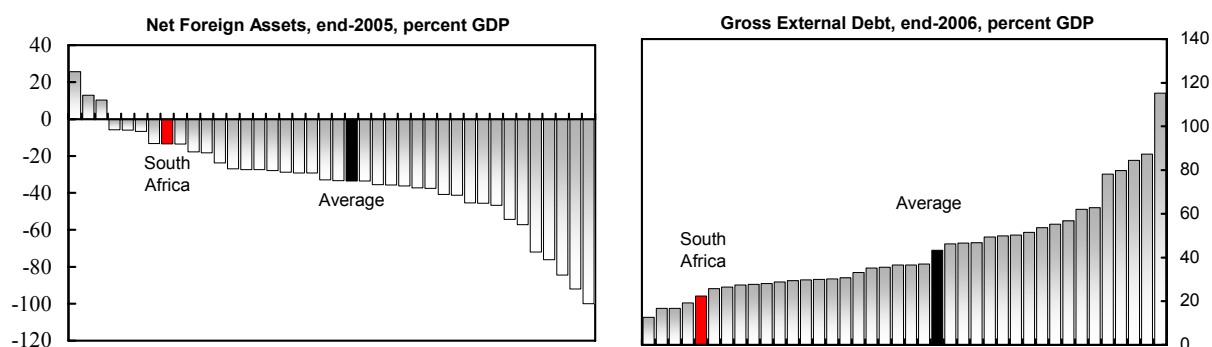
Table I.4. External Sustainability Under Alternative Assumptions  
(Percent of GDP)

	GDP Growth Assumptions		
	3.0	4.5	6.0
Current account balance consistent with:			
NFA stable at end-2005 level (-13.3 percent of GDP)	-0.9	-1.1	-1.3
NFA stable at emerging market average (-33.5 percent of GDP)	-2.4	-2.8	-3.3
NFA stable at -67 percent of GDP	...	...	-6.5
NFA stable at -77 percent of GDP	...	-6.5	...
NFA stable at -92 percent of GDP	-6.5	...	...

Source: IMF staff estimates.

15. A similar approach to assessing the sustainability of the current account position is to focus more narrowly on external debt, as the IMF's debt sustainability assessments do routinely. This also requires assumptions about both growth and the amount of debt that will be regarded as sustainable, as well as about the sustainable level of non-debt-creating capital inflows (FDI and portfolio equity investment). Table I.5 illustrates the current account balances that would stabilize external debt at the end-2006 level of 22 percent of GDP, which is well below the average for emerging markets shown in Figure I.5. With real GDP growth of 4.5 percent and assuming net nondebt creating capital inflows are sustained at 2.0 percent of GDP (roughly their level over the past 10 years), a current account deficit of 3.9 percent of GDP would stabilize external debt at end-2006 levels. Under the same assumptions, the 2006 current account deficit of 6.5 percent of GDP would be consistent with a stable external debt to GDP ratio of 53 percent of GDP.

Figure I.5. External Liabilities in Emerging Markets



Sources: IMF International Financial Statistics and IMF staff estimates.

especially exchange rate changes, have been important in explaining year-to-year changes in South Africa's NFA position, they do not seem to have affected its general trend over the past decade.

Table I.5. External Debt Sustainability Under Alternative Assumptions  
(Percent of GDP)

		Real GDP growth		
		3.0	4.5	6.0
Net non-debt-creating inflows		<i>Debt-stabilizing current account balances:</i>		
	0.0	-1.6	-1.9	-2.2
	2.0	-3.6	-3.9	-4.2
	4.0	-5.6	-5.9	-6.2

Source: IMF staff estimates.

## Current Account “Norms”

16. **A substantial body of research has identified a number of relatively robust determinants of current account balances**, among them

- ***Fiscal balance.*** In the absence of full Ricardian equivalence, higher public savings raise national saving, increasing the current account balance.
- ***Demographics.*** The higher the share in the population of economically inactive dependents, the lower are national savings and the current account balance. This effect is usually captured by the old age dependency ratio and the rate of population growth (the latter to reflect the share of economically dependent young people).
- ***Terms of trade.*** An improvement in the terms of trade boosts the current account. Some specifications also use a country’s net balance of trade in oil.
- ***Income level and economic growth.*** The current account balance is expected to increase with a country’s relative stage of economic development but to decline with growth that is high relative to its trading partners.

17. **The relationship between current account balances and various fundamentals can then be estimated.** Estimates tend to be sensitive to the choice of countries, explanatory variables, and sample period (Chinn and Prasad, 2003). The inclusion of country-specific effects in the estimation can also significantly affect the results.

18. **The results from two such estimations are presented in Table I.6.** Estimates based on a panel of 54 advanced and emerging market economies for the 1973–2004 period used in the IMF staff Consultative Group on Exchange Rate issues (CGER) exercise are reported in the left-hand column. As a consistency check, the results from an alternative estimation based on a panel of 49 emerging market countries (EMC) for 1991–2006 and a modified set of explanatory variables are shown in the right-hand column.<sup>5</sup> In both, all the variables have

<sup>5</sup> For more details of the CGER estimates, see IMF (2006). The EMC panel estimation is explained in Appendix I. The main differences between the two estimations, besides the samples used, are the choice and measurement of variables. The EMC panel uses the terms of trade in place of the oil balance used in the CGER

(continued...)

the same signs, except relative income, which probably reflects the sensitivities in estimation noted by Chinn and Prasad (2003).

Table I.6. Current Account Determinants<sup>1</sup>

	CGER Estimates	Emerging Market Estimates
Fiscal balance	0.19 ***	0.11 ***
Old-age dependency	-0.12 **	...
Population growth	-1.03 ***	...
Dependency ratio	...	-4.98 ***
Oil balance	0.17 ***	...
Terms of trade	...	0.08 ***
GDP growth	-0.16 **	-0.11 ***
Relative income	0.02 *	-0.39 ***
Lagged current account	0.36 ***	0.33 ***
Adjusted R <sup>2</sup>	0.52	...

Source: IMF staff estimates.

<sup>1</sup> The dependent variable is the current account (in percent of GDP). \*\*\*, \*\*, \* denote statistical significance at 1, 5, and percent levels, respectively.

19. **Illustrative current account norms can then be calculated by applying the estimated coefficients from these equations to the underlying values of the explanatory variables.**<sup>6</sup> Using the CGER equation, the “normal” current account deficit for a country with South Africa’s economic characteristics is about 1.8 percent of GDP. Though its relatively strong fiscal position and low dependency ratios tend to increase the calculated normal current account balance, this is more than offset by South Africa’s position as a net oil importer, its relatively early stage of economic development (relative to the U.S.), and its high rates of growth relative to its trading partners, all of which suggest that a deficit is normal.<sup>7</sup> Using the alternative EMC estimates, South Africa’s current account norm would be a deficit of 2.6 percent of GDP.

20. **From a long term perspective, South Africa’s current account deficit is above levels that might be considered sustainable or “normal”.** The current account will need to

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exercise. It also uses a single measure of dependency in place of the two measures used in the CGER exercise. For the CGER exercise, all variables are computed as deviations from the average of trading partners. For the EMC all variables are measured in absolute terms, except for relative income which is measured as a percent of U.S. per capita income.

<sup>6</sup> The aim is to uncover the medium-term relationship between the current account and its determinants. The underlying values of the determinants are therefore typically either projected medium-term values or filtered values in which cyclical fluctuations have been removed.

<sup>7</sup> Given the high incidence of HIV/AIDS in South Africa, there is a particular difficulty in determining the appropriate dependency ratio to use.

adjust at some stage to prevent external liabilities from rising without limit. However, with a relatively comfortable stock position, as measured by NFA and gross external debt positions relative to those in other emerging markets, investors may be prepared to finance a relatively large current account deficit for South Africa for some time.

#### **D. South Africa's Vulnerability to a Sudden Stop in Capital Inflows**

21. **Whether South Africa's current account deficit is cause for concern also depends critically on the outlook for financial flows.** This is difficult to assess. It depends substantially on global factors, such as the availability of liquidity and investor sentiment toward emerging markets. This section considers whether there are any structural market factors that could affect the near-term outlook for financial flows. It also considers fundamental factors considered important in determining a country's vulnerability to a sudden stop.

##### **The Outlook for Financial Flows<sup>8</sup>**

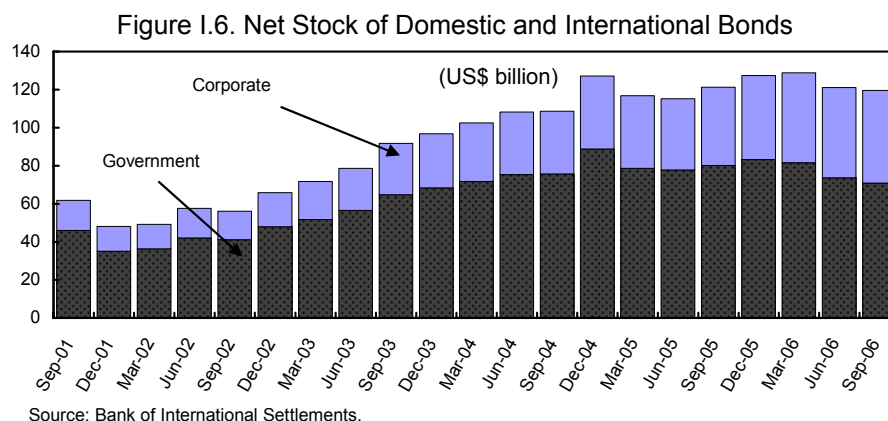
22. **The near-term outlook for financing flows will continue to depend heavily on global appetite for emerging market assets and, for South Africa, on the outlook for commodity prices.** Some market-specific factors suggest that South Africa may continue to attract significant global flows. Besides the country's supportive macroeconomic fundamentals, the fact that the South African equity market is relatively large gives it more depth and liquidity than most other emerging equity markets.<sup>9</sup> However, although foreign equity investment is thought to have come primarily from investors with a long-term orientation, such as mutual and pension funds, the depth and liquidity of the market also makes it easier for investors to quickly reduce their exposure, which may leave South Africa vulnerable should sentiment toward emerging markets turn negative.

23. **Bond purchases are considerably smaller than equity purchases but seem to be increasing as a source of portfolio financing.** With the stock of government bonds projected to decline, expansion of these inflows requires that investors shift to corporate bonds, as indeed they have been doing gradually in recent years (Figure I.6). Bond flows have also offset some of the volatility in equity flows during recent episodes of market turbulence (including May-June and September 2006), as some investors shifted funds from equities to lower-risk bonds rather than reduce their country exposure entirely.

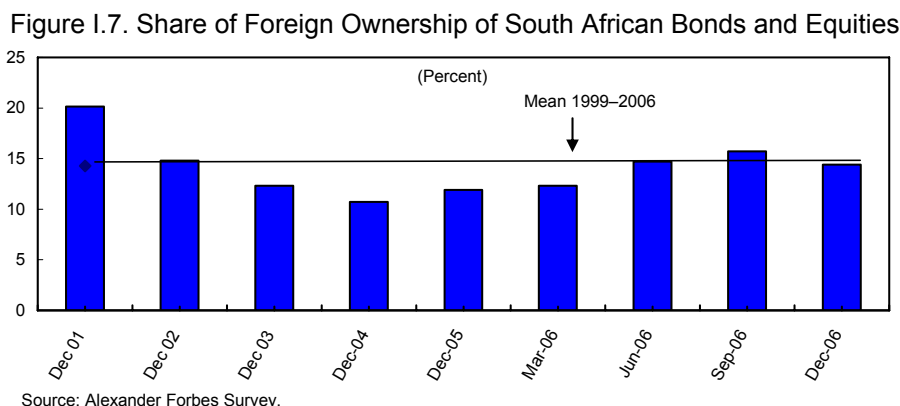
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<sup>8</sup> This section has benefited from contributions from Sean Craig and Brian Bell.

<sup>9</sup> The outlook for mergers and acquisitions and private equity FDI inflows is likely to be driven by factors similar to those affecting portfolio equity financing. However, the relatively low leverage of South African companies is thought likely to make them an attractive target for further private equity deals.



24. **It appears that the increase in portfolio inflows in recent years has been partly supported by a rebuilding of positions.** The share of South African assets owned by foreigners rose from a low of 10.7 percent in December 2004 to 14.4 percent in December 2006—close to the average for the past eight years but well below peak foreign ownership of 20 percent in 2001 (Figure I.7). Investor surveys, however, suggest that foreign investors may still be underweight in South African equities relative to the Morgan Stanley Capital Index (MSCI) benchmark. In the JP Morgan survey, South African equities account for 7.9 percent of investor portfolios, slightly (0.5 percentage points) below its weight in the MSCI benchmark.<sup>10</sup>



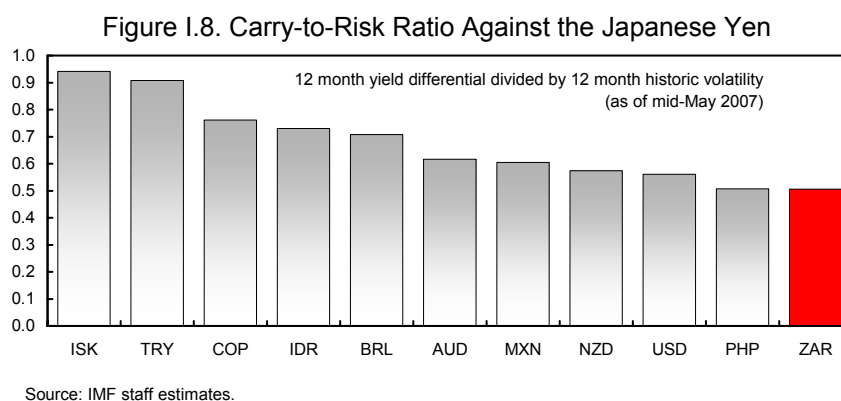
25. South Africa is also thought to have benefited from global carry trades, although quantifying their extent (and the country's vulnerability to their reversal) is difficult.<sup>11</sup> These

<sup>10</sup> The MSCI covers 26 emerging equity markets and uses weights based on the market capitalization in each country. The weights give the relative size of each market. While some international equity funds benchmark against the MSCI, not all investors do. Thus, an under- or overweight position gives at best a very rough indication of whether or not investors will increase equity purchases to raise their asset allocation to a country.

<sup>11</sup> A carry trade is a currency strategy that exploits opportunities presented by expectations of low borrowing costs in one market segment and expected high returns in another.



trades are hard to measure directly, but the returns on the rand carry trade are below those on other key carry trade destination currencies. This reflects the relatively high volatility of the rand, which reduces risk-adjusted returns. As of mid-May 2007, the carry-to-risk ratio was less favorable for South Africa than for other emerging markets and other carry trade destinations, suggesting that South Africa may have benefited less than other markets from these trades. This may correspondingly reduce its vulnerability to carry trade unwinding (Figure I.8.).



### The Risks of a Sudden Stop in Capital Inflows

26. **While the previous discussion offer some reassurance that the current account deficit is not necessarily an immediate cause for concern, it nevertheless exposes South Africa to a sudden stop in capitals flows.** Even where solvency concerns are not immediate, there remains the risk of an abrupt and sharp reduction in the availability of foreign resources. Sudden stops tend to occur about once every eight to nine years on average in emerging markets and tend to be costly when they do occur (Becker and others, 2007). Here, we consider factors that affect a country's vulnerability to a sudden stop.

27. **A growing literature suggests that, although sudden stops are hard to predict, there are factors that help explain a country's vulnerability to them (Table I.7):**<sup>12</sup>

- *Some of these factors are exogenous.* Sudden stops tend to come in bunches, suggesting contagion (Calvo, Izquierdo, and Mejía, 2004). They are more likely to occur when, globally, growth is falling and liquidity (as proxied by U.S. interest rates) is tightening

<sup>12</sup> Sudden stops are defined a little differently in each study. Becker and others (2007) define them as reduction in capital inflows of 5 percent of GDP. Calvo, Izquierdo, and Mejía (2004) define them as a reduction in capital inflows of two standard deviations below a sample mean. Chamon, Manasse, and Prati (2006) use a more eclectic definition in identifying sudden stop episodes that are likely to be associated with currency, sovereign, banking, or corporate crises. Also considered here are studies of large and rapid reversals in current account deficits, a phenomenon closely related to sudden stops, by Edwards (2004) and Debelle and Galati (2005).

(Debelle and Galati, 2005). Chamon, Manasse, and Prati (2006) find that the risk of a crisis increases when global commodity prices are low.

- *Others reflect current domestic macroeconomic conditions.* Edwards (2004) and Becker and others (2007) both find that a widening current account deficit will itself increase the risk of a sudden stop. Strong growth tends to reduce the risk. Credit growth (Edwards) and exchange rate overvaluation (Becker and others) are also identified as risk factors.
- *The structural features of an economy are also important.* Calvo, Izquierdo, and Mejía (2004) argue that the risk of a crisis increases with the share of liabilities that are denominated in foreign currency (“liability dollarization”). They also find that openness matters: having a large tradable sector reduces the contraction necessary to adjust to a cut-off in funding. Becker and others (2007) find that the degree of integration with international financial markets also matters: more integrated economies are more at risk of a reversal in capital flows. Some have found the stock of debt, both public and external, a risk factor. Foreign exchange reserves can help to reduce the risk of a sudden stop according to the studies by Edwards (2004) and Chamon, Manasse, and Prati (2006). Becker and others (2007) also determine that the exchange rate regime matters: countries with less flexible exchange rate regimes tend to be more vulnerable to a sudden stop.<sup>13</sup>

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<sup>13</sup> Not all factors are significant in each study. For example, foreign reserves, credit growth, debt levels, the terms of trade, and the exchange rate regime, were considered in the study by Calvo, Izquierdo and Mejía (2004) but not found to be significant. Various studies have found that the composition of financing flows (whether, for example, there is a reliance on supposedly volatile elements of the financial account) is not useful in determining the risk of a sudden stop.

Table I.7. Summary of Factors Affecting the Probability of a Sudden Stop  
in Capital Flows/Sharp Current Account Reversal<sup>1</sup>

	Calvo (2004)	Edwards (2004)	Debelle (2005)	Chamon (2006)	Becker (2007)
<i>Macroeconomic conjuncture</i>					
Current account deficit		↑			↑
GDP growth				↓	↓
Real exchange rate appreciation or overvaluation					↑
Credit growth		↑			
<i>Structural features</i>					
Liability dollarization / currency mismatch	↑				↑
Financial openness					↑
Trade openness	↓				
Fixed exchange rate regime					↑
Foreign exchange reserves		↓		↓	
Public debt					↑
External debt		↑		↑	
<i>Exogenous / global factors</i>					
Terms of trade / commodity prices				↓	
Global growth			↓	↓	
US interest rates			↑		

<sup>1</sup> Based on Calvo, Izquierdo, and Mejía (2004); Edwards (2004); Debelle and Galati (2005); Chamon, Manasse, and Prati (2006); and Becker and others (2007). Arrows denote whether an increase in each factor raises (upward arrow) or lowers (downward arrow) the probability of a sudden stop or sharp current account reversal.

28. **Some sudden stops seem more disruptive than others.** The results from three studies of the determinants of the impact of a sudden stop on growth are summarized in Table I.8.<sup>14</sup> All find that economies that are relatively open and have flexible exchange rate regimes tend to recover more quickly from a sudden stop. Evidence about the impact of liability dollarization is more mixed: Guidotti, Sturzenegger, and Villar (2004) confirm that it has a detrimental impact on growth in the aftermath of a crisis, although the effect is relatively small; Edwards (2004) finds no significant impact. A study by the IMF (2007) finds that the initial size of the current account deficit matters: countries with larger external imbalances tend to go through more painful adjustment when a correction eventually takes place. It also finds a role for the flexibility of labor and product markets in easing the burden of adjustment. By reducing the fixed costs of entry and exit into export markets, greater flexibility in production structures tends to enhance a country's aggregate trade responsiveness to exchange rate movements.

<sup>14</sup> In addition to the studies by Edwards (2004) and Guidotti, Sturzenegger, and Villar (2004), an assessment of the adjustment of external imbalances from IMF (2007) is also included. This last study is somewhat broader in scope than the other studies. It looks at all current account reversal episodes and has some useful insights on the factors that affect an economy's capacity for domestic adjustment.

Table I.8. Summary of Factors Affecting the Growth Impact of a Sudden Stop or Sharp Current Account Reversal<sup>1</sup>

	Edwards (2004)	Guidotti (2004)	IMF (2007)
<i>Macroeconomic conjuncture</i>			
Current account deficit			↑
<i>Structural features</i>			
Liability dollarization / currency mismatch		↑	
Trade openness	↓	↓	↓
Fixed exchange rate regime	↑	↑	↑
Economic flexibility			↓

<sup>1</sup> Based on Edwards (2004); Guidotti, Sturzenegger, and Villar (2004); and IMF World Economic Outlook (2007). Arrows denote whether an increase in each factor increases (upward arrow) or decreases (downward arrow) the adverse impact on growth of a sudden stop or sharp current account reversal.

**29. An assessment of these indicators in South Africa produces a number of insights (Table I.9).**

- The recent widening of the current account deficit will have increased the risk of a sudden stop and possibly also the output costs associated with adjustment.
- South Africa's high degree of integration with global financial markets, while bringing many benefits, may also raise its vulnerability to reversals in capital inflows.<sup>15</sup>
- South Africa's openness to trade is similar to the average for Latin America but below the average for other emerging markets. It is, however, in the middle of the range one would expect given geographical determinants (Frankel, Smit, and Sturzenegger, 2006).
- Relative economic flexibility is difficult to measure, although one simple indicator suggests that the flexibility of product and labor markets in South Africa is similar to the average for other emerging markets.<sup>16</sup>
- South Africa's foreign exchange reserves have increased significantly in recent years. In relation to other countries, South Africa's holdings are broadly comfortable in terms of short-term external debt, but relatively low in terms of other indicators. South Africa's holdings are markedly above the 100 percent of short-term external debt benchmark, but remain below the sum of the current account deficit and short-term debt—another commonly used benchmark.

<sup>15</sup> Capital markets in advanced economies, however, have tended to remain open during periods of financial market turbulence or episodes of sharp exchange rate adjustment (i.e. they do not experience a sudden stop). South Africa has arguably behaved more like an advanced country in this regard. During the turbulence of 2001–02, for example, the reduction in capital inflows was a relatively modest 2½ percent of GDP.

<sup>16</sup> The indicator, which is similar to that used in IMF (2007), is based on indicators of the cost of starting and closing a firm and of hiring and firing labor.

- The extent of liability dollarization in South Africa is low, with only modest currency mismatches, which would tend to reduce the risk of a sudden stop. Only 13 percent of government debt is exposed to exchange rate movements; and measures of whole economy liability dollarization are also well below the average for emerging markets.<sup>17</sup>
- Indebtedness, both public and external, is also relatively low.
- South Africa's flexible exchange rate should help the economy adjust to a sudden stop.

Table I.9. Selected Indicators Associated with Sudden Stops or Sharp Current Account Reversals

	South Africa	Emerging Markets <sup>1</sup>				
		All		Asia	Europe	Latin America
		Average	Median			
Liability dollarization / currency mismatch						
Public sector <sup>2</sup>	12.6	22.0	18.2	15.3	16.0	28.8
Whole economy <sup>3</sup>	33.7	92.8	48.6	48.0	98.9	93.0
Trade openness <sup>4</sup>	52.7	72.8	63.7	85.0	91.9	51.0
Foreign exchange reserve coverage <sup>5</sup>	73.7	242	115	274	101	269
Gross public sector debt (percent of GDP)	31.9	48.0	42.4	53.7	31.7	49.0
Gross external debt (percent of GDP)	21.9	46.7	41.7	32.4	59.9	37.1
Economic flexibility <sup>6</sup>	67.6	67.2	70.1	64.1	70.8	66.3

Sources: IMF staff estimates.

<sup>1</sup> Sample of 49 emerging market economies. Data are for 2006.

<sup>2</sup> The percentage of public sector debt in foreign currency or linked to the exchange rate. South African figures refer to end-FY05/06.

<sup>3</sup> Currency mismatch in whole economy is proxied by the ratio of foreign liabilities of the financial sector to money in the banking sector (following Becker and others, 2007).

<sup>4</sup> Trade openness is the ratio of imports and exports of goods to GDP.

<sup>5</sup> Foreign exchange reserve coverage is the ratio of gross international reserves to the sum of the current account deficit plus maturing debt.

<sup>6</sup> Economic flexibility is a measure of product and labor market flexibility constructed from the World Bank Costs of Doing Business indicators (following IMF, 2007). The measure represents an index from 0 to 100, with a higher number representing increased flexibility.

## E. Conclusions and Policy Implications

30. **In terms of whether South Africa's current account position should be viewed as an immediate threat, it is reassuring that the widening deficit increasingly reflects rising investment and not a growing fiscal imbalance.** South Africa's relatively low external liabilities also provide scope for the economy to run current account deficits for a number of years before liabilities reach levels that might be considered worrisome. Nevertheless, deficit levels of 6½ percent of GDP, financed by portfolio inflows, will continue to leave South Africa exposed to a sudden stop in capital flows, with potentially painful consequences.

31. **Macroeconomic tightening to reduce the current account deficit could reduce the risk of a sudden stop.** In this regard, the recent tightening of fiscal policy is appropriate

<sup>17</sup> For a more detailed discussion, see Chapter IV of these Selected Issues Papers, "Assessing Macroeconomic Vulnerabilities in South Africa: An Application of the Balance Sheet Approach."

in view of the widening external deficit. Going forward, it would be advisable to maintain a neutral fiscal stance until the current account deficit starts to decline. Some further accumulation of foreign exchange reserves may also help to lower South Africa's vulnerability to a reversal in capital flows.

32. **The strong fundamentals already in place should help to limit the consequences of a sudden stop.** The flexible exchange rate regime and low liability dollarization will help to mitigate the costs of adjusting to an abrupt reduction in capital inflows. Continued improvements in the structure of external debt could further reduce these costs. Over the longer term, structural reforms to make the economy more flexible and increase its openness to trade, for example through trade liberalization, might also reduce the likelihood and the costs of a sudden stop.

## Appendix I. Panel Estimation of Current Account “Norms” for Emerging Market Economies

### A. Model Specification and Analysis

$$CAGDP_{it} = X_{it}\beta + \varepsilon_{it} \quad (1)$$

with  $i = 1, \dots, N$  ;  $t = 1, \dots, T$  ; and  $\varepsilon_{it} = \alpha_i + \mu_{it}$  .

In equation (1)  $i$  indexes countries,  $t$  indexes years,  $CAGDP_{it}$  is the current account in percent of GDP, and  $X_{it}$  is a vector of explanatory variables, which includes economic growth, relative income, the fiscal balance, the dependency ratio, and the terms of trade. A lagged dependent variable is also included in the vector of explanatory variables. The  $\alpha_i$  are unobserved country-specific effects,  $\beta$  is a vector of unknown parameters to be estimated, and  $\mu$  is the vector of residuals.

With the inclusion of a lagged dependent variable and in light of the possibility that the hypothesis of strict exogeneity of explanatory variables can be violated, OLS estimates would be biased and inconsistent. We use the dynamic generalized method of moments (GMM) estimation proposed by Arellano and Bond (1991). GMM is an instrumental variable estimator that uses a broad set of instruments to derive consistent and asymptotically efficient estimates. The instruments include lagged values of all endogenous regressors as well as lagged and current values of all exogenous regressors.

Arellano and Bond (1991) suggest that the only assumption required on the initial conditions  $CAGDP_{it}$  is that they are not correlated with the subsequent disturbances  $\mu_t$  for  $t = 2, 3, \dots, T$ . The time-invariant country-specific effects are treated as correlated with the lagged dependent variable and are therefore a source of inconsistency. First-differencing eliminates this source of inconsistency as it removes the  $\alpha_i$  from equation (1) above. Arellano and Bond propose two types of differenced GMM estimators, the one-step and the two-step.<sup>18</sup> The two-step estimator is considered the most efficient as unlike the one-step estimator, it does not require or assume homoskedasticity of the disturbances. We use the two-step estimation, noting that studies have shown that efficiency gains may be modest and that the standard errors might be biased downward. Because the consistency of the estimates depends on the validity of the instruments and the absence of second-order serial correlation, for the two-step estimator Arellano and Bond also propose that the Sargan test for overidentifying restrictions and second-order serial correlation test be used to check the validity of the instruments. In the regression for the EMC panel presented in Table I.6, the  $p$ -values for the

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<sup>18</sup> Details on the procedures can be found in Arellano and Bond (1991).

Sargan and second-order serial correlation tests are 0.29 and 0.34, respectively, denoting failure to reject the null hypotheses that the instruments are not correlated with the residuals and that there is no second-order serial correlation.

### **B. Data Source, Variable Description, and Countries in the Sample**

All series are from the IMF *World Economic Outlook*, April 2007 (WEO). We use annual data.

Some variables do not need to be defined.

- *Dependency* is measured as total population divided by total labor force; a higher figure denotes more dependency.
- *Relative income* is measured as the ratio of purchasing power parity (PPP)–based per capita income to U.S. per capita income.
- *Growth* is real GDP growth.
- *Fiscal balance* is measured as the ratio of the general government budget balance to GDP
- *Terms of trade* is measured as the ratio of the export price index to the import price index.

**Countries:** Algeria, Argentina, Bosnia, Brazil, Bulgaria, Chile, China (mainland), Colombia, Costa Rica, Croatia, Czech Republic, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Guatemala, Hungary, India, Indonesia, Israel, Jamaica, Jordan, Kazakhstan, Korea, Latvia, Lebanon, Lithuania, Malaysia, Mexico, Morocco, Pakistan, Panama, Peru, Philippines, Poland, Romania, Russia, Serbia and Montenegro, Slovak Republic, Slovenia, South Africa, Sri Lanka, Thailand, Tunisia, Turkey, Ukraine, Uruguay, and Venezuela.



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## II. EXCHANGE RATE VOLATILITY AND INFLATION TARGETING: INTERNATIONAL EXPERIENCE AND IMPLICATIONS FOR SOUTH AFRICA<sup>1</sup>

### A. Introduction

1. **The South African government's Accelerated and Shared Growth Initiative (ASGISA) lists the relative volatility of the exchange rate as a constraint on economic growth.** Volatility can complicate investment and trade decisions, especially in outward-oriented sectors; and the exchange rate for the rand has in fact been quite variable. However, the government's view is that volatility is being contained as a result of pursuing sound macroeconomic policies and maintaining adequate international reserves, and that no specific policy to address volatility is warranted. Low and stable inflation is the main policy objective of the South African Reserve Bank (SARB), which operates an inflation-targeting framework. Though the SARB often purchases foreign exchange (FX) to gradually build up its international reserves, it does not try to directly influence the level or volatility of the exchange rate. That is, interventions are limited to those serving the purpose of strengthening reserves.

2. **This paper examines from an international perspective the volatility of the rand exchange rate and some of the policy issues it raises.** By some standard measures the South African rand has been relatively volatile in recent years, but it is not an outlier among inflation-targeting countries. Rand volatility is very difficult to account for on the basis of movements in fundamentals. This is not surprising. The literature consistently finds that exchange rate volatility cannot be adequately explained by fundamental shocks alone; nonfundamentals, such as herd effects and contagion, may also be factors. The paper also discusses whether a case can be made for a policy that actively addresses the exchange rate and surveys policies in inflation-targeting countries that have confronted this question. Although countries may follow a variety of policies, there recently seems to be a preference for restraint in reacting to the behavior of the exchange rate in the more advanced inflation-targeting countries, which may consider acting only when they see convincing evidence that the exchange rate has become significantly misaligned.

3. **The paper discusses in some detail policies designed to address large misalignments, such as those that have been adopted in some inflation targeting countries.** Exchange rates can sometimes move far from fundamentals. These episodes are associated with high long-run real exchange rate volatility, which is especially hard to hedge against. For this reason, some central banks have adopted policies that permit them to act in response to perceived misalignment, possibly by engaging in intervention in the FX market. The prerequisites for such actions tend to be defined in advance and the action themselves

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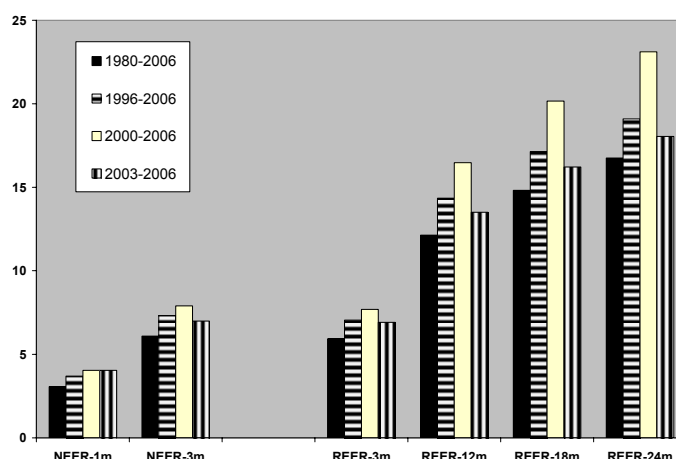
<sup>1</sup> Prepared by Alfredo Cuevas.

tend to be disclosed because one purpose of those interventions is to call the attention of markets to wide misalignments. However, adopting this type of policy may risk of confusing the public about the objectives of the monetary authority, whose primary concern is control of inflation. There is also the problem of whether the monetary authority can in fact identify episodes of misalignment. These and similar considerations should be weighed carefully before deciding whether this type of policy could be a good choice for a particular country.

4. **A main conclusion of the paper is that there seems to be no compelling case for the South African Reserve Bank to change its policy towards intervention.** This is especially clear in the context of short-term rand exchange rate volatility: South Africa has hedging opportunities and deep financial markets, two characteristics that make it possible for it to deal with exchange rate volatility at horizons of several months to a year without the need for policy action. But a similar conclusion applies to other forms of intervention policy, given the policy risks surrounding them.

## B. Rand Exchange Rate Volatility

Figure II.1. Rand Exchange Rate Volatility (Percent), Various Periods



Sources: WEO database and IMF staff estimates.

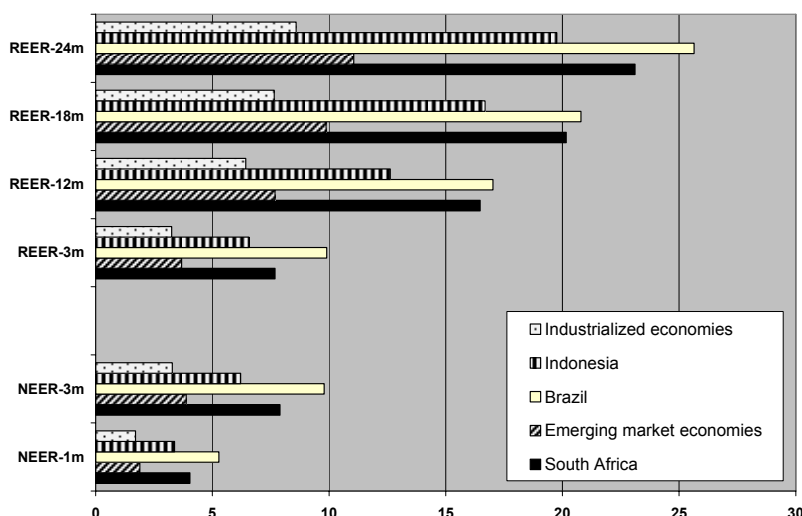
5. **Historical exchange rate volatility can be measured at various horizons and in real or nominal terms.** Over a few days, weeks, or months prices are likely to be relatively rigid, making volatility of the nominal exchange rate the most interesting indicator. But over one or more years, prices have time to adjust, making volatility of the real exchange rate more interesting. In what follows, exchange rate volatility is calculated as the standard deviation of the *change* in the logarithm of the exchange rate—a common definition. This measure is usually preferred to the standard deviation of the exchange rate itself because it allows for sustained trend movements in the exchange rate. The volatilities shown in Figures II.1–3 are calculated for exchange rate changes between two dates a given number of months apart. For instance, a real effective depreciation between March in a given year and September of the following year goes into the calculation of the volatility shown in

Figure II.1 as a vertical bar labeled REER-18m.<sup>2</sup> Figure II.1 shows that rand volatility has been increasing, except during the most recent three years, when it has declined.

6. **Among countries currently under inflation targeting, South Africa seems to have a relatively volatile exchange rate at all time horizons, but it is by no means an outlier.<sup>3</sup>**

This is the message from Figures II.2–3 and Appendix I, Tables 1–4, which contain the detailed country information upon which the figures are based. Figures II.2 and II.3 show that emerging market countries exhibit higher volatility than industrial countries at all horizons, and that the rand has been more volatile than the average emerging market currency. Nevertheless, other currencies are also quite volatile: the Indonesian rupiah and the Brazilian real, the latter being the most volatile of all in our sample. A comparison between Figures II.2 (covering 2000–2006) and II.3 (covering 2003–2006) also show that the decline in volatility of the last three years has been generalized.

Figure II.2. Exchange Rate Volatility in Selected Countries (Percent): 2000–06

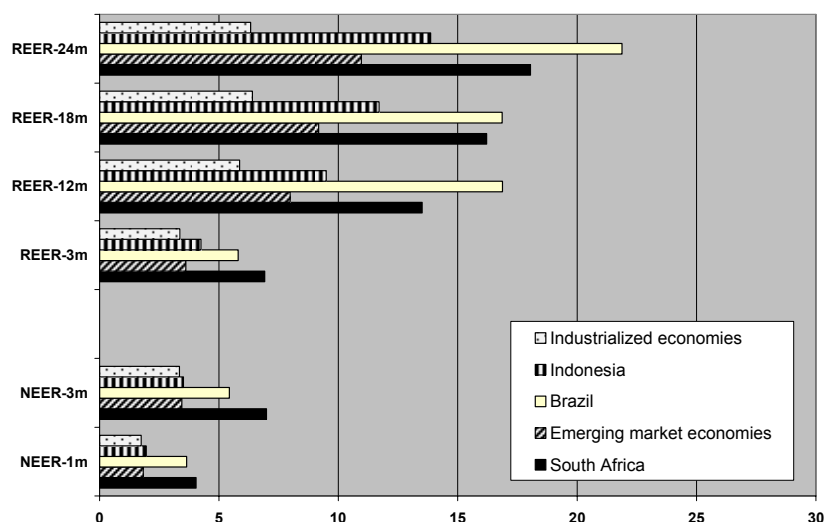


Sources: WEO database and IMF staff estimates.

<sup>2</sup> The standard deviations shown in Figures II.1–3 are calculated with depreciations over overlapping periods (e.g., for 3-month volatility, we use the depreciations between January and April, February and May, and so on). Thus, the observations are not independent. This does not affect the analysis, which focuses on broad comparisons across countries, and makes measurements robust to the exact start of the sample period.

<sup>3</sup> In addition to South Africa, the sample comprises seven developed economies (Australia, Canada, Iceland, New Zealand, Norway, Sweden, and the UK) and 13 emerging markets from various regions (Indonesia, Korea, Philippines, and Thailand; Brazil, Chile, Colombia, and Mexico; Czech Republic, Hungary, Israel, Poland, and Romania). These countries adopted inflation targeting at different points in time, and thus any measures of historical volatility will cover periods over which different monetary policy regimes may have been in effect.

Figure II.3. Exchange Rate Volatility in Selected Countries (Percent): 2003–06



Sources: WEO database and IMF staff estimates.

### C. Explaining Exchange Rate Volatility in South Africa

#### Volatility and Currency Crises

7. **Figures II.1–3 suggests that measures of exchange rate volatility, whatever the horizon, are highly sensitive to currency crises.** The volatility of industrial country exchange rates is low and stays more or less unchanged in the two sample periods covered in Figures II.2 and II.3 because there were no major currency crises in those countries. The countries showing high volatilities experienced currency crises (or stress) during or near the sample periods (Brazil in 1999 and 2002, Indonesia starting in 1998, and South Africa in 1998 and 2001). At the same time, the volatility of the exchange rate in these countries fell as they left behind their currency crises: for these currencies, Figure II.3 shows significantly lower volatilities than Figure II.2. The data in Appendix I provide additional, easily identifiable examples of this phenomenon.

8. **Currency crises seem to be associated with long-run real exchange rate volatility.** At long horizons the most volatile currencies in our sample have been the rand, the Brazilian real, the Indonesian rupiah, and the Mexican peso. These observations are broadly consistent with those of Hausmann, Panizza, and Rigobon (2006), who compare five-year real exchange rate volatilities for 1980–2000 in 74 countries. In their sample, the South African rand ranks 25th, with lower volatility than the currencies of Chile, Brazil, Indonesia, and Mexico but considerably higher volatility than those of New Zealand, Australia, the UK, Canada, Sweden, and Norway. These authors emphasize that shocks have an especially persistent effect on the volatility of the exchange rate in developing countries.

9. **Episodes of currency crisis or overshooting (usually steep depreciations) tend to have lasting effects on the level and volatility of the exchange rate (both in real and nominal terms).** The appreciation that follows a steep depreciation tends to be gradual and slow. In other words, the exchange rate can remain misaligned for a long time.<sup>4</sup>

10. **Although all currency crises seem to increase volatility, not all crises are the same.** In some cases the currency finally jumped after accumulating disequilibria for some time (e.g., Mexico in 1995 and Indonesia in 1998); in others no obvious major economic event emerges to trigger the crisis (e.g., South Africa in 2001). In yet other cases, overvaluation can build up gradually and be undone quickly during a currency crisis that corrects this imbalance.

### **Volatility and Fundamentals**

11. **Beyond the basic link between currency crises and volatility, the difficulty of explaining exchange rate volatility on the basis of fundamentals is well known.**

Hausmann, Panizza, and Rigobon (2006) employ a long battery of models with different sets of fundamentals as explanatory variables, including terms of trade, stage of the cycle, and structural country characteristics such as the exchange rate regime and openness. While their fundamental variables tend to have the expected qualitative effects on the exchange rate, their variability can only explain a relatively small part of the volatility of the real exchange rate in their sample of 74 countries over a period of 20 years. The authors note that shocks to the exchange rate appear to have persistent effects on its conditional volatility, and that the exchange rates of emerging market currencies are especially volatile.<sup>5</sup>

12. **There are competing explanations for excess volatility, that is, volatility beyond that explained by fundamentals.** Bartolini and Giorgianni (2001) observe that it may be difficult for the researcher to control for the relevant set of fundamentals; they themselves are able to explain only a small part of exchange rate volatility in the sample they study, despite adopting a method that is more robust to the choice of specific fundamentals. Engel and West (2004) propose a more radical explanation for excess volatility in flexible exchange rate regimes. They argue that the exchange rate is just an asset price and thus moves with news

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<sup>4</sup> In this context, a connection between misalignment and overshooting is easy to see. In the short run, while other prices and real variables are rigid, the exchange rate may overreact to shocks and thus become misaligned, in the sense that its level would be different from that compatible with long-run equilibrium—that is, with an equilibrium reached after all prices (and also the real side of the economy if the original shock was real) have had time to adjust. This was the main insight of the classic 1976 Dornbusch model. Overshooting and misalignment can be related more generally if one considers the presence of herd behavior, momentum trading, and similar phenomena that tend to accentuate the movements of the nominal exchange rate.

<sup>5</sup> These authors cite research which suggests that the half life of shocks to the real exchange rate is 3 years on average for a mixed group of countries, and somewhat less for developing countries.

that affects expectations of future changes in fundamentals. For those economies, econometric studies will tend to find excess volatility because it is impossible to directly observe expectations.

**13. The causes of the volatility of the South African rand are not easy to pin down.**

Farrell (2001) establishes that the volatility of the commercial rand was reduced during the period when the financial rand was in effect (1985-1995), but he makes no claim that his models explain a significant proportion of rand volatility. Below we present models similar to Farrell's, estimated using more recent data and controlling for the effects of the financial rand to examine the effects of potential determinants of rand exchange rate volatility.

**14. Table II.1 presents several GARCH-in-mean models for monthly and annual proportional changes in the exchange rate of the rand against the US dollar and for the annual change in the REER.**<sup>6</sup> The sample period starts in the early 1980s, and the models were selected based on their ability to account for exchange rate volatility. A GARCH model has two main elements: a means equation and a variance equation:

- Because our dependent variable in the means equation is the proportional change in the exchange rate, the  $R^2$  from that equation indicates the fraction of (squared) exchange rate volatility in the entire sample period that we can explain with the right-hand side variables. A low  $R^2$  can be a sign of excess volatility, although it may just be the result of omitting important fundamentals. On the right-hand side of the means equation we include lags of the dependent variable, proportional changes in the price of gold and the terms of trade, the interest differential (nominal, real, and its first difference), the inflation differential, and the conditional variance itself.<sup>7</sup>
- The variance equation directly estimates the conditional variance of exchange rate changes at each point in time—an indicator of conditional volatility. The equation makes conditional variance depend on its own lag (the coefficient of which indicates the persistence of shocks to volatility); the squared error of the means equation; the shocks to gold prices and the interest differential; and various measures of reserves (gross reserves, their log, and their ratio to imports).<sup>8</sup> This equation also has a dummy for 1985–1995, the period when the financial rand was in effect.

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<sup>6</sup> Using the NEER gives very similar results. The dependent variable is defined as a proportional change in the exchange rate, not as a percentage change. This does not affect the substance of the results.

<sup>7</sup> The conditional variance was included in the mean regression to capture the hypothesis that in periods of high volatility, depreciations are likely. The results are mixed.

<sup>8</sup> Hveding et al (2004) show the importance of international reserves for exchange rate volatility.



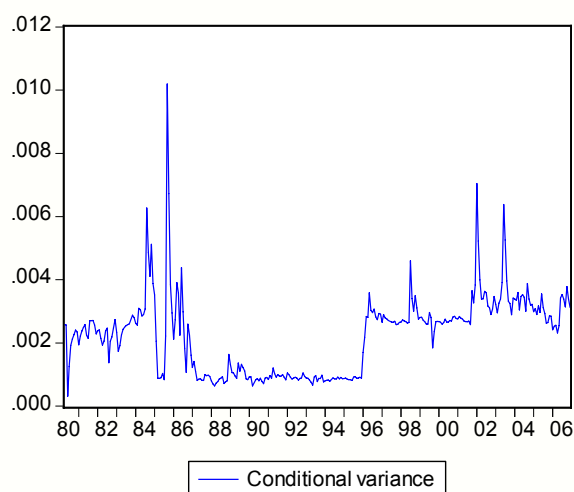
Table II.1. GARCH Regressions for the Proportional Change in the Rand Exchange Rate

Exchange rate Period for measuring change	1 Nominal rand / US\$ 1 month	2 Nominal rand / US\$ 1 Year	3 Nominal rand / US\$ 1 Year	4 REER 1 Year	5 REER 1 Year
<b>Means equation *</b>					
Log (Conditional variance)	-0.007046 0.127	-0.051978 0.293		0.0085 0.328	
Square root (conditional variance)			<b>1.166011</b> 0.051		-0.650278 0.259
C	-0.039568 0.216				
1st Lag dependent variable	0.010871 0.872	0.185076 0.570	0.101644 0.481	0.016584 0.972	-0.083681 0.498
2nd Lag dependent variable	0.074032 0.211				
Change in TOT	<b>0.14962</b> 0.035				
Change in TOT, lagged	0.097522 0.324				
Change in gold price	<b>-0.300531</b> 0.000	<b>-0.845354</b> 0.054	<b>-0.717888</b> 0.000	<b>0.356994</b> 0.061	<b>0.3543</b> 0.002
Change in gold price , lagged	<b>-0.095272</b> 0.047				
RINTDIF, lagged				0.005316 0.403	0.007463 0.199
INTDIF, lagged		-0.012394 0.640	-0.007773 0.178		
DINTDIF, lagged	0.000622 0.842				
INFLADIF, lagged	<b>-0.794131</b> 0.014				
<b>Variance Equation *</b>					
C	<b>0.000458</b> 0.000	0.016878 0.814	0.016987 0.513	0.012891 0.476	0.016138 0.654
Lagged residual, squared	<b>0.151991</b> 0.001	0.149785 0.857	-0.24674 0.149	0.146726 0.739	-0.322125 0.256
Lagged conditional variance	<b>0.600046</b> 0.000	0.599397 0.794	0.697505 0.170	<b>0.600833</b> 0.088	<b>1.059391</b> 0.001
Change in gold price, squared	0.003014 0.786				
DINTDIF, lagged, squared	<b>-4.52E-05</b> 0.000				
Financial rand dummy	<b>-0.000232</b> 0.002	-0.00465 0.839	-0.012338 0.434	-0.012988 0.407	-0.008195 0.425
Gross international reserves (GIR)	<b>-1.12E-08</b> 0.093				
Average GIR in the year		<b>-1.38E-06</b> 0.024		-2.03E-07 0.935	
Average GIR to imports ratio			-0.000324 0.879		
Log (average GIR)					-0.001039 0.783
R-squared	0.132	0.395	0.443	0.046	0.226
Adjusted R-squared	0.083	0.032	0.109	-0.526	-0.161
S.E. of regression	0.041	0.190	0.182	0.194	0.169
Sum squared resid	0.501	0.539	0.496	0.565	0.458
Log likelihood	624.522	9.786	20.071	17.158	22.876
Durbin-Watson stat	1.971	2.612	2.602	2.046	2.078
Sample (adjusted):	4/1980 to 12/2006	1982 to 2006	1982 to 2006	1982 to 2006	1982 to 2006
Observations:	321	25	25	25	25

Source: SARB data and IMF staff estimates.

\* Coefficients in boldface are significant at the 10 percent level or better.

Figure II.4. Conditional Monthly Variance from Model 1 in Table II.1



15. **The bottom line is that fundamentals explain only a small fraction of the exchange rate volatility of the rand, and volatility appears to be persistent.** Although the coefficients on the shocks in the means regression have the correct sign and are often significant, the fit of the models is poor, yielding low  $R^2$ . The only shock that consistently has significant regression coefficients is the change in the price of gold. From the variance equation we see that volatility was suppressed by the financial rand regime, reserves may have the expected negative effect on volatility, and shocks to volatility have persistent effects (Model 5 even suggests a unit root in volatility). To illustrate, Figure II.4 shows the monthly conditional variance of Model 1 in Table II.1. Confirming our earlier observations, the 1998 and 2001 periods of exchange rate crisis coincide with peaks in conditional variance.

16. **The relationship between the size of the market for a given currency and the volatility of its exchange rate is not fully clear.** As a first approximation, one would expect larger, deeper markets to result in less volatile currencies. From this point of view, the rand could be expected to be relatively stable among emerging market currencies, because for the last several years the market for the rand has been one of the largest markets for an emerging market currency, and its turnover is by some measures almost as high as that of currency markets in developed countries (Table II.2; see also Ho and McCauley, 2003, and BIS, 2005). On the other hand, liquid markets might be more volatile because they attract more and more varied investors, who, given a shock, can exit more easily. Investors seeing less liquid markets from which it is hard to exit may decide to stay away from the start, helping keep those markets illiquid. “Hot money,” in particular, will tend to favor more liquid markets. In addition, analysts often argue that the rand is used as a proxy currency for those of other countries whose currency markets are less liquid. In this case, being more liquid than, say, the market for Turkish lira makes the market for the rand more volatile than South African factors would warranted because it absorbs shocks emanating from investor attitudes toward Turkey. However, we have not seen reliable empirical research on this issue.

Table II.2. Foreign Exchange Turnover Net of Local and Cross Border Inter-Dealer Double Counting, April 2004

	Average daily turnover		Composition of turnover (percent of total)		
	Millions of U.S. dollars	Percent of 2004 GDP	Spot	Outright forwards	Foreign-exchange swaps
<b>South Africa</b>	<b>13,656</b>	<b>6.3</b>	<b>17.6</b>	<b>8.2</b>	<b>74.2</b>
<b>Industrialized economies:</b>					
Australia	97,123	15.2	29.4	10.1	60.5
Canada	74,573	7.5	31.8	12.0	56.2
Iceland	...	...	...	...	...
New Zealand	17,661	18.1	22.8	8.3	69.0
Norway	25,714	9.9	18.4	9.9	71.7
Sweden	40,639	11.6	23.7	10.2	66.0
United Kingdom	299,417	13.9	27.7	10.5	61.9
<i>Average</i>	<i>92,521</i>	<i>12.7</i>	<i>25.6</i>	<i>10.2</i>	<i>64.2</i>
<b>Emerging market economies:</b>					
Asia					
Indonesia	2,051	0.8	37.1	13.0	50.0
Korea	21,151	3.1	49.7	28.6	21.7
Philippines	765	0.9	45.1	30.3	24.6
Thailand	3,492	2.2	38.2	14.0	47.8
<i>Average</i>	<i>6,865</i>	<i>1.7</i>	<i>42.5</i>	<i>21.5</i>	<i>36.0</i>
Latin America					
Brazil	4,344	0.7	66.0	24.7	9.3
Chile <sup>1</sup>	2,430	2.5	...	...	...
Colombia <sup>1</sup>	786	0.8	...	...	...
Mexico	20,312	3.0	56.2	8.4	35.3
<i>Average</i>	<i>6,968</i>	<i>1.7</i>	<i>61.1</i>	<i>16.6</i>	<i>22.3</i>
Other					
Czech Republic	2,813	2.6	26.2	9.0	64.8
Hungary	3,625	3.5	20.7	8.5	70.8
Israel <sup>1</sup>	4,772	3.9	...	...	...
Poland	7,031	2.8	22.3	6.9	70.9
Romania	...	...	...	...	...
<i>Average</i>	<i>4,560</i>	<i>3.2</i>	<i>23.1</i>	<i>8.1</i>	<i>68.8</i>
<i>Memorandum Items:</i>					
<b>All countries:</b>					
Average	33,808	5.8	33.3	13.3	53.4
Median	7,031	3.1	28.5	10.2	61.2
Min	765	0.7	17.6	6.9	9.3
Max	299,417	18.1	66.0	30.3	74.2
<b>Emerging market economies:</b>					
Average	6,710	2.5	37.9	15.2	46.9
Median	3,625	2.6	37.6	11.0	48.9

Sources: WEO database, BIS, Triennial Central Bank Survey, April 2004, and staff estimates.

<sup>1</sup> For Chile, Colombia, and Israel the totals are net of local inter-dealer double counting only.

### D. Is Volatility a Problem?

17. **Evidence of the effect of volatility on trade and welfare is inconclusive.** Clark et al. (2004) conclude that trade is not significantly affected by exchange rate volatility. Harjes (2006) reaches a similar conclusion for South Africa. Schmidt-Hebbel (2006) judges that research has established “no clear cut relationship between exchange rate volatility . . . and trade flows and welfare.” However, he does report that volatility tends to be associated with misalignment, which may slow down growth if it becomes too pronounced.

18. **Another concern is that exchange rate volatility may discourage foreign investors by increasing the uncertainty around the returns to their investments in their own currencies.** However, this does not appear to have been a significant issue for portfolio investment in South Africa. Despite the relatively high volatility of the rand in recent years, South Africa has received large volumes of foreign capital, which have gone largely into the markets for stocks and rand-denominated bonds.

19. **Financial and currency markets can help agents deal with uncertainty, reducing some of the potential adverse effects of volatility, especially short-term volatility.** Aghion et al (2006) find that one-year exchange rate volatility has no adverse effects on countries with relatively well developed financial systems (as indicated by the ratio of credit to GDP). Here South Africa compares well with other emerging market countries. Its financial system is sophisticated and well supervised and regulated, and it has high penetration relative to that of other middle-income countries.

20. **Thanks to its derivatives markets, South Africa seems well prepared to handle the volatility of the currency over the short term.** Economic agents should be able to hedge against short-term volatility in the derivatives markets. The South African rand is one of the most heavily traded emerging market currencies; the average *daily* turnover in 2006 was almost US\$11 billion in 2006 (SARB, 2007), of which about US\$9 billion is accounted for by forwards and swaps. This compares with an average total trade bill in 2006 of about US\$10 billion *a month*. In June 2007, the Johannesburg Stock Exchange started operating a rand futures market. Futures and options contracts on the South African rand have been traded for many years on the Chicago Mercantile Exchange and the New York Board of Trade. These have tended to concentrate on the shorter maturities.

21. **Nevertheless, volatility does pose some problems.** Even in countries with deep markets, long-term hedging instruments may be unavailable or costly. Long-term volatility affects especially productive investments with long maturities. The World Bank’s Investment Climate Assessment for South Africa says that “concern about the exchange rate is rated as the second most serious of the constraints to enterprise operations and growth.[...] Businesses made investment and operational decisions on anticipated exchange rates which were often wide of the mark” (World Bank, 2005). And exchange rates sometimes may move in ways that are not directly related to changes in fundamentals, influenced by factors such as herd

effects and contagion. Potential misalignments associated with excess volatility, by sending the wrong price signals, can lead to a misallocation of resources, with adverse implications for growth. These implications may be related to the presence of price rigidities, which in turn can make misalignment persistent. Additionally, it may be difficult for economic agents to tell whether an exchange rate has become misaligned.

### **E. How Could Potential Volatility Problems Be Addressed?**

22. **Inflation-targeting central banks generally look at the exchange rate mostly in terms of the inflation outlook.** To the extent that exchange rate movements affect the outlook, the central bank should be ready to modify its policies. Policy action is not guided by the pursuit of a specific level of the exchange rate, but it is informed by estimates of such parameters as the pass-through from exchange rate to prices. In this context, strong macroeconomic policies and a good international reserve position contribute to contain volatility. In addition, some central banks may try to address exchange rate volatility more directly as we discuss below.

#### **Instruments to Address Volatility**

23. **Central banks can help address issues related to volatility through some long-term policies.** They can encourage the development of hedging instruments, promote deepening of foreign exchange and other financial markets, and maintain adequate reserves. However, none of these actions are targeted at the episodes of overshooting that can give rise to misalignment.

24. **Central banks can try to address specific episodes of exchange rate overshooting with their main policy instrument or by resorting to sterilized intervention (Ho and McCauley 2003).** However, the use of the main instrument to affect the exchange rate can give rise to policy dilemmas, since the instrument should be set with a view to keeping inflation aimed at its medium-term target. This is usually the main rationale for sterilized intervention: to pursue a secondary objective without causing significant disruption to the primary policy.

### Box II.1. Concepts of Intervention

The term *intervention* is sometimes used to refer to different types of actions by the monetary authority. Three main variants can be distinguished (Moreno, 2005):

- *Narrow*: purchase or sale of FX in the market in order to affect the exchange rate.
- *Broad*: any purchase or sale of FX in the market regardless of its purpose.
- *Passive*: purchases or sales of FX outside the market, often initiated by the government (e.g., purchase of the external sales receipts of a state-owned oil company).

In this paper we mostly use the narrow definition, consistent with our focus on options to address exchange rate volatility. It will be clear when another definition is used.

25. **It is usually thought that intervention may act through three channels:** the portfolio, the signaling, and the information channels.

- **The portfolio channel** theory of intervention argues that by altering the mix of assets in the private sector's portfolio, the central bank can induce changes in the exchange rate. The reason is that private agents will accept the new portfolio composition only if the expected returns on the various assets change. To induce investors to hold relatively more foreign currency, for example, the expected return on it (given by the expected depreciation of the home currency) must increase, implying an immediate appreciation of the home currency. This channel has been studied largely in industrial countries, where it is usually thought to be ineffective because interventions are small relative to the balance sheet of the private sector. However, interventions in emerging markets might be more effective if private sector balance sheets are smaller there.
- **The signaling channel** theory argues that interventions can work when they signal future changes in monetary policy. In a sense, they borrow their effectiveness from that of the main policy instrument. They work by bringing forward in time the effect of future interest rate policy actions. The corollary is that this channel can remain effective only as long as the central bank follows intervention with actual changes in its policy rates; it will lose its effectiveness if the signaled policy changes are not delivered. Sweden's Riksbank claims to deliberately use intervention to signal upcoming changes in its policies.
- **The information channel** theory says that intervention works by transmitting to the market information the central bank possesses but the public does not.

26. **Because they get their traction from their impact on information, the last two channels are incompatible with secrecy.** This is one reason intervention policies in some

countries incorporate transparency clauses. However, transparency does expose the central bank to the risk of losing credibility if an announced intervention fails to achieve its objectives. The edge in favor of transparency is usually given by inflation-targeting central banks, which generally pursue relatively open communications policies (Chiu, 2003). These channels would lose their effectiveness if used in many small increments, because the second and subsequent steps add no new information.

27. **The effectiveness of sterilized intervention is a matter of controversy.** Frankel and Dominguez (1993) look at intervention episodes in the main currencies and argue that, to be effective, intervention should be visible and if possible supported by other monetary actions or conducted as a coordinated operation by several central banks. More generally, evidence from industrial countries tends to show that intervention could have immediate though small and short-lived effects on the exchange rate (Sarno and Taylor, 2001; Fatum and King, 2005; Schmidt-Hebbel 2006b). In fact, there is skepticism about its effectiveness in those countries, including among central banks themselves, as demonstrated by their reluctance to intervene in recent years. In contrast, central bankers in middle income countries are more willing to intervene, and their attitude seems to be supported by some researchers (e.g., Disyatat and Galati, 2005). Some of the reasons for the perceived higher effectiveness in those countries are the relatively larger role of the central bank in a less developed financial system, the smaller size of private sector balance sheets, and, in some cases, the presence of capital controls.

28. **The effectiveness of intervention may also be directly related to the extent to which it supports trends in fundamentals.** For example, Becker and Sinclair (2004) argue that Australia's Reserve Bank has been successful in intervening at the peaks and troughs of the exchange rate cycle because its interventions were intended to help the exchange rate return to fundamentals. In addition, the need for consistency between intervention and fundamentals for intervention to be effective was the point generating the strongest consensus among respondents in a survey of central banks discussed in Neely (2006).<sup>9</sup>

### **Possible adverse effects of attempts to reduce exchange rate volatility**

29. **Perhaps the highest risk is that the credibility of the inflation-targeting regime might be jeopardized.** The pursuit of a secondary objective—such as limiting exchange rate volatility—risks confusing the public about the primary objective of the central bank, which

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<sup>9</sup> The emphasis on fundamentals acknowledges that long-run monetary neutrality imposes a limit on what central banks can do. Monetary policy can not lastingly oppose trends in the real exchange rate based on fundamentals. In long run equilibrium, monetary policy provides a nominal anchor, but real factors determine all relative prices, including the real exchange rate. That said, capital controls may provide additional room for maneuver in the short run by closing some of the mechanisms by which capital flows can reinforce real fundamental trends.

should be to control inflation. This risk arises regardless of whether the effort to suppress volatility takes the form of intervention or of modification of interest rates, and regardless of whether efforts to reduce exchange rate volatility succeed. The risk of policy failure must also be considered: an unsuccessful attempt to influence exchange rate behavior could hurt the monetary authority's credibility.

30. **A potential negative side effect of successfully suppressing exchange rate volatility for extended periods could be higher output volatility.** Using policy tools to reduce the volatility of some variable in the face of shocks may simply force the shocks to show in the volatility of other variables. This trade-off has been studied extensively for New Zealand. Using different methodologies, West (2003), Stevens (2006), and Hampton, Hargreaves, and Twaddle (2006) find that using the interest rate to reduce exchange rate volatility can cause output to become more volatile and inflation more persistent because the exchange rate would no longer help the economy process shocks, and actions to stabilize it might even amplify some shocks.

31. **A major implementation problem (and potentially a policy risk) is the difficulty in correctly identifying episodes of exchange rate misalignment.** There is no consensus among economists on what constitutes a reliable model of the exchange rate. Although the decision may be helped by using a variety of models, an element of judgment is inescapably part of an assessment of potential misalignment. If misalignment is mistakenly identified and intervention fails, there may be large costs, including quasi-fiscal and credibility costs and possibly a weakening of the central bank's balance sheet. These costs are illustrated by South Africa's own experience with the use of the forward book to defend the rand before 1998, which generated significant quasi-fiscal losses.

## F. Experiences of Other Countries<sup>10</sup>

32. **Not all inflation-targeting countries have sworn off efforts to influence certain forms of exchange rate behavior.** Several industrial countries have explicit intervention policies and some have in fact intervened (the United Kingdom is almost alone in eschewing all attempts at affecting the exchange rate since 1992). However, the rule among countries is to use intervention sparingly to avoid the adverse consequences discussed above and because they believe that the portfolio channel is not operative. Among emerging market countries it is easier to find central banks that intervene relatively often, perhaps because they consider that intervention is more effective in emerging market countries, and that these countries may have more to lose from volatile exchange rates (Ho and McCauley, 2003). Country practices vary, but a few broad models can be identified from a quick survey of the literature on

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<sup>10</sup> This section and Appendix II, on which it is based, benefited from comments from Fund country teams.



exchange rate policies in inflation-targeting countries (Table II.3 and Appendix , which contains a detailed description of the practices in the countries listed in the table).

- **Explicit provisions for exceptional intervention.** Inflation-targeting central banks in advanced countries do not intervene routinely to smooth short-term fluctuations in the exchange rate, but some of them (including New Zealand, Australia, Canada, and others) have adopted policies for intervention in exceptional circumstances. Typically, these circumstances are defined by severe disruptions in the operation of the market itself or large misalignments in the exchange rate. These policies call for transparency because interventions are meant to convey the views of the monetary authority on the appropriateness of the exchange rate.<sup>11</sup>
- **Discrete frequent intervention.** Some countries, including Indonesia and Thailand, seem to intervene with some frequency to smooth fluctuations in the exchange rate, often without providing information on these operations. This type of policy may have more traction in the presence of significant capital controls. It is possible that countries that are very open to international trade may be more sensitive to exchange rate movements, and thus make a more deliberate effort to manage the exchange rate.
- **So-called “passive intervention”** (Box II.1) is observed in many countries, but it seems to be especially important in countries with large state-owned commodity-exporting companies, such as Indonesia and Mexico. In Mexico, the central bank has a transparent mechanism to transfer to the FX market part of the hard currency acquired through passive intervention.<sup>12</sup>

33. **Reserves accumulation is a common motive for intervention understood in a broad sense.** There are some exceptions to this rule, such as New Zealand, whose central bank aims to have a balanced position in foreign currency, with gross reserves having as counterpart long-term direct loans in foreign currency.<sup>13</sup>

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<sup>11</sup> Chile, an emerging market economy, also has a policy of this type. Referring to the implementation of intervention policy in Chile, De Gregorio and Tokman (2004) write: “...the authorities have made a commitment to intervene in a transparent manner, rather than surprising the market, in order to work through the information channel. Indeed, intervention is done to provide information to the market that the authorities consider the evolution of the exchange rate to be unjustified by fundamentals (short and long-term).”

<sup>12</sup> Relatedly, commodity funds have been established in some countries, including Norway, to invest natural resource revenue abroad rather than to spend them domestically, thereby mitigating upward pressure on the real exchange rate and so-called Dutch disease.

<sup>13</sup> Press reports in July, 2007 indicated that the Reserve Bank of New Zealand may in future hold some portion of its foreign reserves on an unhedged basis.

Table II.3. Exchange Rate Intervention Policies in Selected Countries.

					Central bank may / does intervene to...				
	Foreign Exchange Regime <sup>1</sup>	X + M over GDP, 2006	Perception of important capital controls	"Passive" intervention to a significant degree	Smooth fluctuations in ER; reduce volatility	Exceptionally correct major REER misalignment	Signal future monetary policy	Transparent and / or rules- based interventions	
Brazil	Float	26			X				
Colombia	Float	48			X			In part	
Mexico--after 1998	Float	65		X				X	
Chile--since 2000	Float	76				X		X	
Canada--before 9/1998	Float	70			X			X	
Canada--after 9/1998	Float	70						X	
Australia	Float	43				X		X	
New Zealand	Float	61				X		X	
Norway	Float	75				X		X	
Sweden	Float	94					X	X	
Indonesia	Managed	57	X	X	X				
Korea	Float	85			X				
Philippines	Float	95	X		X				
Thailand	Managed	144	X		X				

Source: IMF (2006) and Appendix II.

<sup>1</sup> "Float" = independent float; "managed" = managed float.

34. **A policy of intervening under exceptional circumstances could potentially reduce long-run volatility of the real exchange rate associated with temporary misalignment and overshooting.** In principle, such a policy could be effective because it does not attempt to lean against fundamentals. Instead, it seeks to bring the exchange rate in line with fundamentals, partly by signaling to the public the presence of misalignment.<sup>14</sup> For this signal to be reliable, the policy would have to impose a strict test for intervention. For example, New Zealand's policy establishes four conditions for intervention to be considered: (i) extreme behavior of the exchange rate by historical standards; (ii) strong evidence of misalignment; (iii) consistency with monetary policy; and (iv) expectation of success.<sup>15</sup>

35. **As noted earlier, the main risk of adopting such a policy would be to undermine the credibility of the inflation-targeting framework.** The public might interpret adoption and activation of an exceptional intervention policy as a weakening of central bank commitment to its inflation target. Failure is also a risk. An unsuccessful intervention could hurt central bank credibility, cause quasi-fiscal losses, and reduce net foreign assets.

<sup>14</sup> A combination of interest rate and intervention could be effective. A large depreciation, for example, would threaten the inflation target, calling for an interest rate rise. The same situation would call for a sterilized sale of foreign currency to quiet markets. These two instruments would complement each other because of the different time lags between their use and their effects.

<sup>15</sup> Recently, the Reserve bank of New Zealand invoked this policy to intervene in the exchange rate market against what it considered an unjustified appreciation of the New Zealand dollar. The exchange rate initially depreciated against most major currencies, but returned to pre-intervention levels within about two weeks.

36. **Implementation problems must be considered.** Identifying misalignment is very difficult. Current models of equilibrium exchange rates have large margins of error, and thus misalignment could be incorrectly diagnosed. Determining the degree of misalignment which may justify an intervention is another complex question. In addition, deciding the degree of transparency of the policy involves issues of governance as well as an evaluation of the effectiveness of the possible channels through which intervention works. Factors such as these increase the importance of judgment under an exceptional intervention policy, which is a necessary complement to any rules-based mechanisms that may be part of the policy implementation framework.<sup>16</sup>

### G. Implications for South Africa

37. **South Africa does not rely on intervention as a policy directly aimed at reducing exchange rate volatility.** Notwithstanding ASGISA's concerns about the effects of rand volatility on growth, the official SARB policy is to intervene only to build up international reserves. The authorities consider that the continued implementation of sound macroeconomic policies and the accumulation of a comfortable level of reserves are the best way to reduce FX volatility.

38. **Based on the data and arguments reported in this chapter, there seems to be no decisive argument for modifying South Africa's approach to exchange rate volatility.** The rand exchange rate has been relatively volatile, although without being an outlier. However, the relevant literature suggests that the evidence on the economic costs of exchange rate volatility is inconclusive. Moreover, South Africa has markets which allow agents to hedge exchange rate risk over horizons of up to a year, which further weakens the case for active policy intervention. Nevertheless, in principle, an explicit exceptional intervention policy like those of Australia, Canada, Chile, or New Zealand could help avoid or limit large misalignments, which have seemed to be associated with long-run exchange rate volatility in several places and at various times. A policy of that type might also offer assurances today that the monetary authority would be willing to act in the face of a severe expectations-driven external shock, and lay the groundwork for an orderly reaction at that juncture.<sup>17</sup> However, there are significant credibility risks, substantial implementation difficulties, and considerable uncertainty regarding the effectiveness of this type of policy, which still has a relatively short track record. Without further study, the balance between potential costs and benefits from such a policy for South Africa would appear to make it difficult to advise its adoption.

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<sup>16</sup> Even mechanical design aspects of such a framework require thought. For example, which indicators of the real exchange rate should be monitored? (Bilateral or effective? Adjusted by relative labor costs or CPI?).

<sup>17</sup> Other types of intervention policy would not seem to be appropriate or necessary for South Africa given its financial development and the availability of hedges for short-term uncertainty.

## Appendix I. Exchange Rate Volatility in a Sample of Countries

Table A1.1. Exchange Rate Volatility at Various Time Horizons in Selected Economies  
(Percent), 1980-2006

<i>Measurement period (months):</i>	NEER		REER			
	1	3	3	12	18	24
<b>South Africa</b>	<b>3.1</b>	<b>6.1</b>	<b>5.9</b>	<b>12.1</b>	<b>14.8</b>	<b>16.8</b>
Industrialized economies:						
Australia	2.1	3.9	3.9	7.4	9.2	11.0
Canada	1.3	2.5	2.7	6.2	8.3	10.2
Iceland	1.7	3.6	3.5	7.0	8.4	8.9
New Zealand	1.8	3.6	3.6	8.3	11.3	13.5
Norway	1.2	2.2	2.3	4.5	5.1	5.4
Sweden	1.6	3.3	3.3	7.2	8.5	9.7
United Kingdom	1.5	2.8	3.0	6.6	8.1	9.6
<i>Average</i>	<i>1.6</i>	<i>3.1</i>	<i>3.2</i>	<i>6.7</i>	<i>8.4</i>	<i>9.8</i>
Emerging market economies:						
Asia						
Indonesia	7.1	13.8	12.9	25.8	28.5	29.0
Korea	3.2	7.0	6.6	11.0	12.7	14.5
Philippines	2.3	4.9	4.9	9.5	11.5	12.4
Thailand	2.4	5.2	5.1	9.2	9.9	10.0
<i>Average</i>	<i>3.8</i>	<i>7.7</i>	<i>7.4</i>	<i>13.9</i>	<i>15.6</i>	<i>16.5</i>
Latin America						
Brazil	12.1	32.2	10.0	17.1	19.9	23.2
Chile	2.2	4.6	4.2	6.6	8.1	9.5
Colombia	3.3	5.6	5.5	9.9	12.4	14.4
Mexico	3.5	7.4	7.0	13.7	17.1	19.4
<i>Average</i>	<i>5.3</i>	<i>12.4</i>	<i>6.7</i>	<i>11.8</i>	<i>14.4</i>	<i>16.6</i>
Other						
Czech Republic	2.3	4.9	4.7	6.7	6.9	7.8
Hungary	1.8	3.5	3.1	5.8	7.1	7.9
Israel	1.7	3.5	3.1	5.3	6.6	7.5
Poland	2.3	4.6	5.9	13.1	15.0	16.0
Romania	11.2	19.3	16.3	23.5	27.4	27.8
<i>Average</i>	<i>3.8</i>	<i>7.1</i>	<i>6.6</i>	<i>10.9</i>	<i>12.6</i>	<i>13.4</i>
Memorandum Items:						
<b>All countries:</b>						
Average	3.3	6.9	5.6	10.3	12.2	13.5
Median	2.3	4.6	4.7	8.3	9.9	11.0
Min	1.2	2.2	2.3	4.5	5.1	5.4
Max	12.1	32.2	16.3	25.8	28.5	29.0
<b>Emerging market economies:</b>						
Average	4.2	8.7	6.8	12.1	14.1	15.4
Median	2.8	5.4	5.7	10.4	12.5	14.5

Sources: WEO database and staff estimates.

Table A1.2. Exchange Rate Volatility at Various Time Horizons in Selected Economies  
(Percent), 1996-2006

<i>Measurement period (months):</i>	NEER		REER			
	1	3	3	12	18	24
<b>South Africa</b>	<b>3.7</b>	<b>7.3</b>	<b>7.1</b>	<b>14.3</b>	<b>17.1</b>	<b>19.1</b>
<b>Industrialized economies:</b>						
Australia	2.0	3.6	3.6	7.5	9.1	10.6
Canada	1.4	2.7	2.7	5.5	7.1	8.7
Iceland	2.0	4.3	4.1	7.6	8.5	8.2
New Zealand	1.9	4.0	3.9	8.8	11.9	14.1
Norway	1.4	2.6	2.7	5.0	5.4	5.8
Sweden	1.3	2.3	2.4	5.8	6.8	7.4
United Kingdom	1.3	2.3	2.3	5.6	7.0	7.9
<i>Average</i>	<i>1.6</i>	<i>3.1</i>	<i>3.1</i>	<i>6.5</i>	<i>8.0</i>	<i>9.0</i>
<b>Emerging market economies:</b>						
Asia						
Indonesia	8.7	16.9	15.8	31.0	33.8	33.8
Korea	3.9	8.5	7.9	13.0	14.9	16.7
Philippines	2.3	4.5	4.7	9.8	11.8	12.2
Thailand	2.9	6.3	6.0	10.9	11.6	11.5
<i>Average</i>	<i>4.4</i>	<i>9.0</i>	<i>8.6</i>	<i>16.2</i>	<i>18.0</i>	<i>18.5</i>
Latin America						
Brazil	5.2	10.0	10.0	18.7	21.6	24.8
Chile	2.0	4.1	4.1	7.0	8.7	9.9
Colombia	3.8	6.1	6.1	10.4	12.7	14.2
Mexico	2.0	3.8	4.1	8.6	13.1	16.3
<i>Average</i>	<i>3.3</i>	<i>6.0</i>	<i>6.1</i>	<i>11.2</i>	<i>14.0</i>	<i>16.3</i>
Other						
Czech Republic	1.5	2.9	2.9	5.4	5.5	5.6
Hungary	1.5	2.8	2.6	5.0	5.9	6.4
Israel	1.9	3.9	3.2	5.7	7.4	8.4
Poland	2.2	4.1	4.5	8.3	10.9	12.0
Romania	3.8	9.2	6.1	13.9	16.5	16.9
<i>Average</i>	<i>2.2</i>	<i>4.6</i>	<i>3.9</i>	<i>7.7</i>	<i>9.2</i>	<i>9.9</i>
<i>Memorandum Items:</i>						
<b>All countries:</b>						
Average	2.7	5.3	5.1	9.9	11.8	12.9
Median	2.0	4.1	4.1	8.3	10.9	11.5
Min	1.3	2.3	2.3	5.0	5.4	5.6
Max	8.7	16.9	15.8	31.0	33.8	33.8
<b>Emerging market economies:</b>						
Average	3.2	6.5	6.1	11.6	13.7	14.8
Median	2.6	5.3	5.4	10.1	12.2	13.2

Sources: WEO database and staff estimates.

Table A1.3. Exchange Rate Volatility at Various Time Horizons in Selected Economies  
(Percent), 2000-06

<i>Measurement period (months):</i>	NEER		REER			
	1	3	3	12	18	24
<b>South Africa</b>	<b>4.0</b>	<b>7.9</b>	<b>7.7</b>	<b>16.5</b>	<b>20.2</b>	<b>23.1</b>
<b>Industrialized economies:</b>						
Australia	2.0	3.6	3.6	7.0	8.5	10.4
Canada	1.5	2.9	2.8	5.3	6.7	8.4
Iceland	2.4	5.2	5.1	9.4	10.6	10.2
New Zealand	2.1	4.3	4.2	8.7	11.5	14.0
Norway	1.5	2.8	2.9	5.8	6.3	6.5
Sweden	1.3	2.3	2.3	5.5	6.8	7.6
United Kingdom	1.2	1.9	1.9	3.4	3.2	3.0
<i>Average</i>	<i>1.7</i>	<i>3.3</i>	<i>3.3</i>	<i>6.4</i>	<i>7.7</i>	<i>8.6</i>
<b>Emerging market economies:</b>						
Asia						
Indonesia	3.4	6.2	6.6	12.6	16.7	19.8
Korea	1.5	3.2	3.2	6.0	7.0	8.9
Philippines	1.8	3.4	3.7	8.3	10.5	11.0
Thailand	1.1	2.4	2.5	5.0	5.9	7.4
<i>Average</i>	<i>1.9</i>	<i>3.8</i>	<i>4.0</i>	<i>8.0</i>	<i>10.0</i>	<i>11.8</i>
Latin America						
Brazil	5.3	9.8	9.9	17.0	20.8	25.6
Chile	2.3	4.8	4.7	7.9	9.5	10.5
Colombia	4.3	6.1	6.2	10.6	13.3	15.2
Mexico	1.8	3.5	3.6	7.5	10.2	11.8
<i>Average</i>	<i>3.4</i>	<i>6.0</i>	<i>6.1</i>	<i>10.7</i>	<i>13.4</i>	<i>15.8</i>
Other						
Czech Republic	1.2	2.1	2.1	4.4	6.1	6.5
Hungary	1.7	3.0	3.1	5.8	6.6	6.7
Israel	1.7	3.3	2.8	5.3	6.9	7.5
Poland	2.4	4.5	4.9	9.9	12.7	14.2
Romania	2.0	4.3	3.3	7.3	9.3	11.1
<i>Average</i>	<i>1.8</i>	<i>3.4</i>	<i>3.2</i>	<i>6.5</i>	<i>8.3</i>	<i>9.2</i>
<i>Memorandum Items:</i>						
<b>All countries:</b>						
Average	2.2	4.2	4.1	8.0	10.0	11.4
Median	1.8	3.5	3.6	7.3	9.3	10.4
Min	1.1	1.9	1.9	3.4	3.2	3.0
Max	5.3	9.8	9.9	17.0	20.8	25.6
<b>Emerging market economies:</b>						
Average	2.5	4.6	4.6	8.9	11.1	12.8
Median	1.9	3.9	3.7	7.7	9.9	11.1

Sources: WEO database and staff estimates.

Table A1.4. Exchange Rate Volatility at Various Time Horizons in Selected Economies (Percent), 2003-06

<i>Measurement period (months):</i>	NEER		REER			
	1	3	3	12	18	24
<b>South Africa</b>	<b>4.0</b>	<b>7.0 #</b>	<b>6.9</b>	<b>13.5</b>	<b>16.2</b>	<b>18.0</b>
<b>Industrialized economies:</b>						
Australia	1.8	3.1	3.2	6.5	6.9	7.5
Canada	1.7	3.2	3.1	3.9	3.9	5.0
Iceland	2.6	5.6	5.6	8.1	8.1	5.7
New Zealand	1.9	4.3	4.2	7.9	9.5	9.5
Norway	1.8	3.0	3.2	6.0	6.6	6.2
Sweden	1.4	2.2	2.3	4.9	6.4	7.0
United Kingdom	1.2	2.0	2.1	3.7	3.5	3.4
<i>Average</i>	<i>1.7</i>	<i>3.3</i>	<i>3.4</i>	<i>5.9</i>	<i>6.4</i>	<i>6.3</i>
<b>Emerging market economies:</b>						
Asia						
Indonesia	1.9	3.5	4.3	9.5	11.7	13.9
Korea	1.4	2.8	2.7	5.0	6.0	6.5
Philippines	1.8	3.2	3.5	8.0	10.1	11.6
Thailand	1.0	2.1	2.1	4.8	4.9	5.2
<i>Average</i>	<i>1.5</i>	<i>2.9</i>	<i>3.1</i>	<i>6.8</i>	<i>8.2</i>	<i>9.3</i>
Latin America						
Brazil	3.7	5.4	5.8	16.9	16.9	21.9
Chile	2.2	4.3	4.2	7.9	7.9	10.4
Colombia	2.2	4.1	4.3	11.4	14.1	15.2
Mexico	1.7	3.4	3.7	6.9	8.3	8.7
<i>Average</i>	<i>2.4</i>	<i>4.3</i>	<i>4.5</i>	<i>10.8</i>	<i>11.8</i>	<i>14.0</i>
Other						
Czech Republic	1.0	1.8	2.0	3.8	4.7	5.0
Hungary	1.8	3.2	3.3	5.8	6.5	6.7
Israel	1.4	2.5	2.2	3.4	4.6	5.2
Poland	2.3	3.8	3.8	10.2	13.0	15.2
Romania	1.7	3.6	3.1	8.0	10.5	12.3
<i>Average</i>	<i>1.7</i>	<i>3.0</i>	<i>2.9</i>	<i>6.2</i>	<i>7.9</i>	<i>8.9</i>
<i>Memorandum Items:</i>						
<b>All countries:</b>						
Average	1.9	3.5	3.6	7.4	8.6	9.5
Median	1.8	3.2	3.3	6.9	7.9	7.5
Min	1.0	1.8	2.0	3.4	3.5	3.4
Max	4.0	7.0	6.9	16.9	16.9	21.9
<b>Emerging market economies:</b>						
Average	2.0	3.6	3.7	8.2	9.7	11.1
Median	1.8	3.4	3.6	8.0	9.2	11.0

Sources: WEO database and staff estimates.

## Appendix II. Detailed Country Experiences

### *Australia*

**The Reserve Bank of Australia (RBA) has a policy of intervening to trim the “peaks and troughs of the exchange rate cycle” without aiming for a specific level for the exchange rate** (Andrews and Broadbent, 1994; Becker and Sinclair, 2004). This policy evolved from a concern about short-term volatility in the 1980s, when the exchange rate was first floated. The RBA is also ready to intervene to calm a disorderly market. Additionally, the RBA intervenes to purchase foreign exchange for its reserves.

**An important element of intervention policy aims to prevent overshooting, understood as a marked deviation of the exchange rate from its equilibrium value as estimated by the RBA.** The RBA identifies overshooting by looking at how extreme the value of the Australian dollar has become and whether it is supported by fundamentals. This type of policy, in effect since 1998, initially resulted in intervention on 4 percent of trading days; but there has been no intervention aimed at influencing the exchange rate since 2001.<sup>18</sup> RBA researchers claim that intervention has been effective because it has been profitable. Their argument is that effective intervention is profitable because the RBA buys its own currency at the top of the real exchange rate cycle and sells it at the bottom.

### *Brazil*

**Since 1999 the Brazilian government has pursued inflation targeting within a flexible exchange rate framework.** As macroeconomic conditions allow, it also has sought to accumulate a buffer of international reserves as a shield against external shocks. In recent months, Brazil has intervened both in the spot and forward markets to acquire reserves, which have increased from US\$ 60 billion since mid-2006 to US\$145 billion in June, 2007.

**The government has not tried to target a specific level of the exchange rate, but has intervened to reduce exchange rate volatility amid concerns that exchange rate overshooting could inflict permanent damage to the economy.**<sup>19</sup> Frequent FX interventions may, however, have reinforced speculative inflows, and in April, 2007 the authorities stopped pre-announcing the type, quantity, and timing of their interventions in the forward market.

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<sup>18</sup> In recent years, small scale interventions have taken place with the objective of rebuilding reserves, which were run down during 1997-2001.

<sup>19</sup> Wu (2006) estimates a series of central interventions for the period July 1999–June, 2003, as well as a central bank reaction function, and concludes that interventions respond to lagged changes in the exchange rate.



## *Canada*

**Canada's intervention policy has evolved through several distinct stages (Fatum and King, 2005; Chiu, 2003).** According to these sources, until 1998 Canada followed a policy designed to smooth the fluctuations of the exchange rate between the U.S. and Canadian dollars without targeting any specific value for the exchange rate. There would be a moving band of a certain narrow width for “normal” daily fluctuation. If the exchange rate at some point in the day breached the band, this would trigger smoothing action by the central bank: sale of a predetermined quantity of U.S. dollars if the Canadian currency was depreciating too fast and purchase if it was appreciating. The band position was reset the day after a breach. The policy and its parameters were known, although the bank did not comment on its interventions. In other words, the central bank would “lean against the wind” in a systematic and predictable way. The policy of intervention bands underwent some modifications over time in response to studies that showed its effectiveness was limited, but it remained essentially unchanged until 1998. Modifications introduced in 1995—the band was widened, but the size of the intervention was increased—tended to make intervention less frequent and to raise its visibility by informing the public about interventions. In 1998, after a major review of its intervention policy concluded that it was largely ineffective, the central bank abandoned it. A recent study by central bank staff reaffirmed that the effects of intervention, although discernible, were very small and lasted no more than a few days or even hours.

**After abandoning the policy of intervention bands, Canada announced a new policy that promised to let the exchange rate float freely unless circumstances became critical.** The special circumstances in which intervention may be considered are exceptional, so there is no doubt that this policy sets the bar for intervention very high. The message is that no intervention is the norm. In fact, the Bank of Canada has never invoked the escape clause to intervene in the FX market.

**The central bank may also react to substantial and persistent exchange rate movements if they are likely to have a net impact on inflation.** If the cause of an exchange rate move is a change in external demand for Canadian goods and services (a Type I movement, e.g., from higher oil prices), there is no policy reaction. The rationale is that the movement in the exchange rate (say, appreciation in response to higher external demand) will to some extent offset the initial shock to aggregate demand, helping keep demand in balance with aggregate supply and inflation on target. If, however, the exchange rate moves because of “portfolio rebalancing” (a Type II movement, e.g., investors buying Canadian assets), the Bank of Canada would move the interest rate to offset the impact that the exchange rate change would have on external demand for Canadian goods and therefore ultimately on prices. That is, reducing the interest rate would be the response to Type II appreciation. While that is not its explicit intention, this policy should have a dampening effect on Type II currency movements.

## *Chile*

**Chile has an escape clause from its independent float (De Gregorio and Tokman, 2004; Schmidt-Hebbel 2006).** As explained by these authors, the central bank can intervene to prevent the exchange rate from deviating too grossly from fundamentals and causing

potentially damaging consequences for the economy. These intervention events are for pre-announced duration and have clear, large ceilings for the cumulative intervention. This clause has been invoked twice by the Chilean central bank to deal with bouts of volatility, one caused by the risk of contagion from the Argentine crisis (2001) and the other by the brief capital account reversal Brazil experienced in the run up to the 2002 presidential election. In both cases, the central bank sold U.S. dollars and dollar-indexed bonds in support of the peso through daily auctions over a pre-announced period. The interventions, which were seen as “a first line of defense to inflation coming from excessive depreciation” (De Gregorio and Tokman, 2004), were generally successful in calming the exchange rate market because they provided confidence that the market would not dry up. Indeed, in the 2002 episode the sum set aside for intervention was not exhausted.

### *Colombia*

**Colombia’s central bank intervenes in the FX market at times to influence the exchange rate, provided intervention does not conflict with the inflation objective.** (The central bank has met its annual inflation objective for the past three years, and in 2006 inflation fell to 4.5 percent.) The central bank employs two types of intervention:

- *Discretionary:* Purchases and sales of FX in the spot market without prior announcement at an exchange rate chosen by the central bank
- *Options-based:* The central bank can intervene through the use of options to buy FX if the currency is more appreciated (and to sell if it is more depreciated) than its 20-day moving average. There are two variants to options-based intervention: (i) the accumulation/ decumulation window, which allows the central bank to say it is prepared to write options for a specified amount for a 30-day period; and (ii) the volatility window, which requires the central bank to write options for up to US\$180 million that can be exercised within 30 days if the daily exchange rate deviates by more than 2 percent from its 20-day moving average.

From January 2000 to May 2007, the central bank’s net foreign exchange purchases totaled US\$12.8 billion, with strong intervention since late 2003. Despite intervention of US\$4.9 billion in the first five months of 2007, the exchange rate appreciated by 14 percent during that period.

### *Indonesia*

**A 1999 law gives the Bank of Indonesia (BI) the mission of preserving the value of the rupiah; value is understood to refer both to its purchasing power in terms of goods and services and its rate of exchange against foreign currencies.**<sup>20</sup> While controlling inflation is billed as the primary policy objective, especially since the formal adoption of inflation

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<sup>20</sup> This description is based on materials available at the Bank of Indonesia’s website: [www.bi.go.id](http://www.bi.go.id) explaining the objectives and tasks of BI and the implementation of their inflation targeting framework.

targeting in 2005, there is also a concern to avoid excessive fluctuation in the exchange rate, albeit without pursuing any specific exchange rate objective. The BI implements its policies by setting a short-term interest rate, conducting open market operations, and intervening in the FX market. Data on intervention are not available.

### *Korea*

**Exchange rate policy is jointly determined by the finance ministry and the central bank in Korea, which has an independently floating exchange regime according to the IMF classification.** The Bank of Korea (BOK) limits its intervention to smooth volatility—in particular, to “smooth radical changes in the exchange rate when there is a transient external shock or a bid-offer gap due to one-sided exchange rate expectations” (Kim, 2006). Some observers see the BOK as in practice operating an intermediate exchange rate system, with large FX intervention supported by capital restrictions and the goal of stabilizing the effective exchange rate (see Kim and Park, 2006). However, there is little evidence to support this claim: the Korean won has appreciated by some 25 percent in real effective terms since 2003. Moreover, capital account liberalization has been very rapid since the financial crisis of the 1990s, and the level of openness at present is comparable to that of advanced countries.

### *Mexico*

**Mexico does not seek to manage the movement or limit the volatility of the exchange rate.** There has been no discretionary intervention by the central bank at all for the last six years; not since 2001 has it bought FX from the private sector. The central bank has sold FX to the private market only in an even, nondiscretionary manner, following a rule announced in early 2003 (Ortiz, 2006). Under this policy, the volatility of the peso against the U.S. dollar has been broadly similar to that of the Canadian dollar or the euro.

**The Bank of Mexico regularly engages in “passive” intervention by purchasing the FX cash flow coming from the public sector** (mainly from external sales of oil by Pemex, a government-owned oil company, but also generated by the government’s issuance of external debt), **and by selling the government dollars to service its external debt.**<sup>21</sup> Thus reserves can move up or down according to the net FX cash flow of the public sector; except for occasional short periods, net FX flow is usually positive because of the inflow from PEMEX. The higher oil export prices of recent years have quickened the net inflow despite a slower pace of net government external borrowing.

**To curb the pace of such passive reserve accumulation, the central bank in early 2003 adopted a transparent rule for selling to the market 50 percent of the FX acquired through its passive intervention.** The rule is an auction mechanism that measures the increase in reserves during a quarter (resulting from the passive intervention and the interest

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<sup>21</sup> Using terminology from Moreno (2005) explained in Box 2 of the main text.

earned on reserves), and then sells to the market half of that amount in daily sales of equal size, spread over the following four quarters. At the start of each quarter, the bank announces the amount of daily sales for that quarter as determined by the formula.<sup>22</sup>

### *New Zealand*<sup>23</sup>

**The policy objective of the Reserve Bank of New Zealand (RBNZ) is to keep prices stable while avoiding unnecessary volatility in output, interest rates, and the exchange rate.** The RBNZ in fact has what some commentators consider the best designed intervention policy among inflation-targeting central banks (see Schmidt-Hebbel, 2006b). Though it has generally abstained from intervening, the RBNZ's policy permits intervention in the foreign exchange market in two types of cases (Eckhold and Hunt, 2004):

- *Crisis intervention:* Since it adopted a floating exchange rate regime in 1985, the RBNZ has maintained that it will enter the market at times of extreme disorder if it sees a severe threat to the functioning of the exchange rate market. Indeed, this eventuality is the official reason for RBNZ to hold gross international reserves.
- *Intervention geared at affecting the exchange rate:* Since March 2004 the NZRB may intervene in cases of extreme misalignment. Four conditions have to be met for the NZRB to consider intervention:
  - The exchange rate must be at an extreme level by historical standards;
  - It must be far from its equilibrium value as estimated by the RBNZ;
  - Intervention must not work against the grain of the monetary policy stance, which is determined in relation to the overriding inflation-control objective; and
  - Market conditions must be such that intervention is highly likely to succeed.

After the situation has normalized, the RBNZ will gradually reverse the original intervention, taking care not to affect the exchange rate market.

The second rationale for intervention given above is based on the idea that the exchange rate market can occasionally exhibit distortions, such as herding behavior, and that this,

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<sup>22</sup> In the early years of the floating exchange rate (1995–1998), the Bank of Mexico sometimes intervened for two purposes: to buy dollars for its reserves, and to provide liquidity to the market (Carstens and Werner, 1999). The first type of action was implemented through the sale of put options, which gave holders the right to sell dollars to the central bank at a pre-specified price, the second, through pre-announced auctions of dollars.

<sup>23</sup> This section was last revised at end-June 2007. Press reports indicate some modifications to New Zealand's foreign exchange management framework have been introduced in July 2007. These have not been reflected here.

combined with the activities of momentum traders who act on the basis of technical analysis, can lead to misalignment of the exchange rate. Any intervention must be communicated to the public. Invoking this rationale for the first time since it started floating its currency in 1985, New Zealand intervened in the foreign exchange market in mid-2007 to fight appreciation that it deemed inconsistent with fundamentals. Immediately following intervention the New Zealand dollar depreciated by 2 percent against the US dollar and by somewhat less against most other major currencies (the exception was the Japanese yen); but within about two weeks, the New Zealand dollar exchange rates had gone back to pre-intervention levels.

### *Norway*

**The main objective of Norges Bank (NB) is low and stable inflation.** The policy interest rate is set with reference to the inflation target but also seeks to avoid unnecessary fluctuations in employment and output. The NB has no exchange rate target and has not intervened in the FX market. Also, the NB's experience with intervention aimed at defending the level of the exchange rate in the 1990s has been judged negatively by NB management (Gausdal, 2000).

**However, the NB contemplates the possibility of intervening** if the exchange rate were to deviate “substantially from the levels that the Bank judges to be reasonable in relation to fundamentals, and if exchange rate developments weaken the prospect of achieving the inflation target,” and also in response to sharp fluctuations resulting from a drop in the liquidity of FX markets (Gjedrem, 2004).<sup>24</sup>

### *Philippines*

**The Philippine central bank (BSP) officially allows the market to determine the value of the exchange rate “with some scope for occasional BSP action to dampen sharp fluctuations in the exchange rate”** (Bangko Sentral ng Pilipinas, 2006). The BSP claims it refrains from heavy intervention because of the problems that would create for monetary policy, including the costs of sterilization. According to some analysts, the BSP has at times seemed to pursue exchange rate stability by using the interest rate and other instruments to respond to exchange rate movements (see Mariano and Villanueva, 2006). The BSP act states that “to maintain the convertibility of the peso, the Bangko Sentral may, at the request of any banking institution operating in the Philippines, buy any quantity of foreign exchange offered, and sell any quantity of foreign exchange demanded, by such institution.”

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<sup>24</sup> Norway is subject to large external shocks in the form of changes in the price of its key exports, oil and natural gas. However, these are absorbed to a significant extent by fiscal guidelines that (with some exceptions) mandate that petroleum revenue be invested abroad via the Government pension Fund-Global.

### *Sweden*

**Sweden has not intervened in the exchange rate market since 2001, and exchange rate considerations have not affected the interest rate decisions of the Riksbank's Executive Board (Giavazzi and Mishkin, 2006).** Between 1993 and 2001 the Riksbank had intervened in the exchange rate market on 7 to 8 percent of business days in order to reduce volatility or correct perceived misalignments (Humpage and Ragnatz, 2006). However, its experience with FX interventions, especially during 2001, was not fully satisfactory, and a new intervention policy was announced in 2002 (Sveriges Riksbank, 2001 and 2002).

**Sweden is unusual in that its current policy allows the consideration of interventions with the explicit aim of signaling future changes in monetary policy motivated by price stability concerns (Heikensten and Borg, 2002).** Interventions should therefore be followed by interest rate actions and should be transparent both for governance reasons and to ensure that they actually send the desired signal. Interventions are not expected to be motivated by movements in the exchange rate itself, especially short-term fluctuations. Like many other inflation targeters, Sweden does not attempt to manipulate the level or volatility of the exchange rate if the inflation outlook is positive. The Riksbank also reserves the right to intervene in the FX rate market in exceptional cases “to promote market functionality” and to “support the general objectives of economic policy.”

### *Thailand*

**The Bank of Thailand operates a managed exchange rate regime and has a policy of intervening “from time to time [...] to prevent excessive volatilities in the markets, while fundamental trends are accommodated;”** in implementing its policy, the bank’s “primary concern is large and persistent departures of the exchange rate from its fundamental values, rather than short term fluctuations” (Bank of Thailand, 2005). Indeed, a main motivation for Thailand’s approach is a concern about the impact of exchange rate fluctuations on a very open economy. If there are exchange rate pressures, then, the BOT would intervene “to slow down the speed of change [of the exchange rate] in order to allow adequate time for the real sector to adjust” (Kirakul, 2006). Effective capital controls, including to deter short term inflows, have been essential to allow the BOT to manage the exchange rate while avoiding policy dilemmas (McCauley, 2006). The Bank of Thailand does not publish data on its interventions, but determines on a case-by-case basis whether to conduct its intervention in a more or less discrete manner, depending on whether it deems that revealing its intervention may be useful. The bank regularly conducts evaluations of its intervention operations.

### *United Kingdom*

**The Bank of England (BOE) has no explicit policy about intervention or the setting of interest rates in response to exchange rate developments.** However, the way the Monetary Policy Committee (MPC) dealt with the real appreciation of the pound in the second half of the 1990s gives a hint to BOE thinking on this subject (this discussion is based on Cobham, 2006a and 2006b).

Between August 1996 and July 1997 the pound gained 23 percent in real effective terms and remained at that high level for a considerable time. The BOE did not try to reverse this behavior by setting the policy rate or intervening in the FX market; the MPC discussed and for several reasons rejected these options:

- The BOE did not want to create public confusion about its priority: the control of inflation. The MPC believed that the inflation control credibility of the BOE would be jeopardized if it attempted to achieve an exchange rate objective.
- MPC members were generally frustrated by the instability of the relationship between interest and exchange rates, and in particular by the failure of uncovered interest parity. They felt that an attempt to influence the exchange rate with interest rates could easily backfire if the exchange rate moved in the wrong direction.
- They were generally of the view that the proper response to a movement of the exchange rate depended on the reason for the movement—but it was extremely difficult to identify the reasons for particular exchange rate movements, which are often the result of multiple shocks that might individually call for different policy reactions. Misidentifying the root cause of an appreciation could lead to the wrong policy response.
- At no point did the MPC feel that sterilized intervention had a chance of succeeding without reinforcing interest rate actions—but interest rate actions needed to be motivated by the inflation objective.

**MPC members were particularly skeptical of the suitability of intervention as a signaling device.**

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### III. RAPID CREDIT GROWTH IN SOUTH AFRICA: CAUSES AND CONSEQUENCES<sup>1</sup>

#### A. Introduction

1. **Rapid credit growth has become a common phenomenon among emerging economies.** The pace of credit extension to households and corporations raises a number of issues and calls for appropriate policy response. Common policy issues are the problems of identifying when credit growth is excessive, the balance between prudential and macroeconomic measures, constraints on policy options, and the effectiveness of various proposed measures.
2. **Credit growth has also emerged as a possible issue in South Africa.** Rapid credit expansion has shown little signs of abating and the effects of policy rate increases of 250 basis points since June 2006 have been limited so far. Household saving rates are now negative and the current account deficit has reached 6 ½ percent in 2006, financed mostly by portfolio inflows.
3. **Moreover, financial sector development in post-apartheid South Africa has unique characteristics.** Access to formal and modern financial services had long been denied to a significant part of the population and expectations are high for credit to contribute to increased well-being. Meanwhile, South African society is changing rapidly, notably with an expanding middle class in strong demand for financial services. This is reflected in a unique combination of issues of developmental and advanced nature.
4. **This chapter looks at the causes and consequences of the recent acceleration of credit in South Africa.** Drawing on international experience with episodes of credit growth, it looks at the factors behind the significant accumulation of credit, before assessing possible risks and examining the policy options available. The chapter finds that credit growth in South Africa responds to factors shared with other emerging economies, with a particular role for structural changes in income distribution, and that it has been relatively well funded by a sound financial system. Although the potential macroeconomic implications of growing debt across income categories have to be monitored closely and signs of tension on asset quality and household balance sheets have emerged, large imbalances associated with rapid credit growth were not identified in South Africa and financial sector risks are contained. The chapter also suggests some further enhancements to the surveillance and regulation functions, which should contribute to a smooth path toward higher levels of credit.

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<sup>1</sup> Prepared by Jérôme Vacher (MCM).

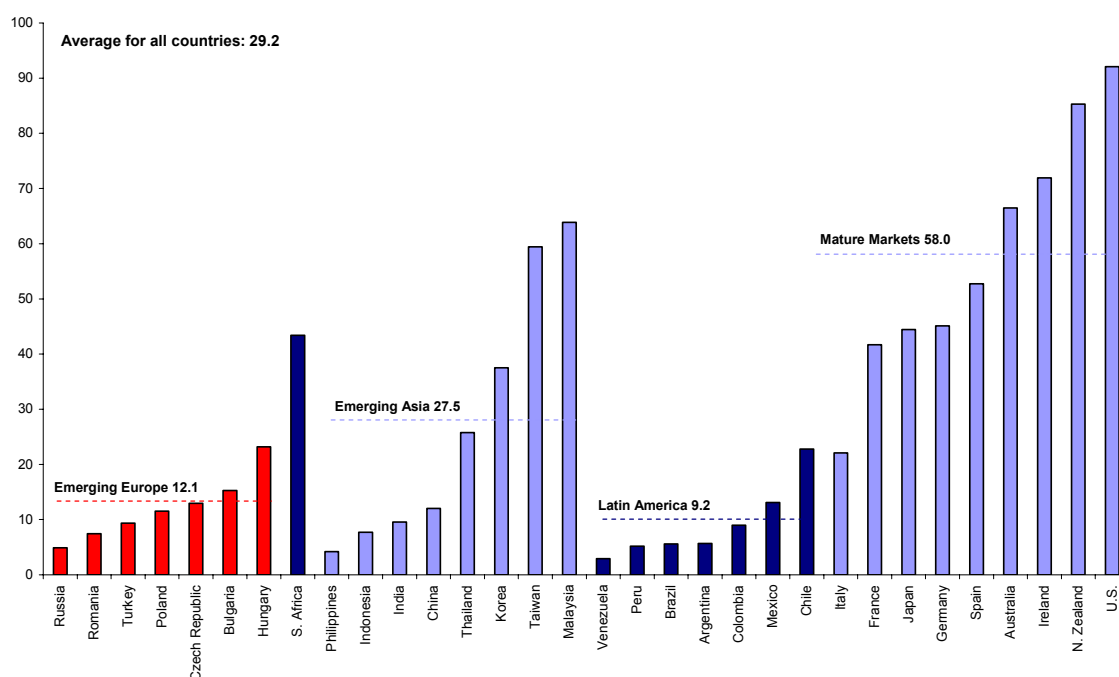
## B. How Fast Is Credit Growing in South Africa?

### Stylized Facts

5. **Although credit growth in South Africa has been relatively high for several years, it has recently accelerated.** Credit to the private sector has grown at an average rate of 15.2 percent for the last ten years but in 2005 and 2006 it was well above that rate, ultimately reaching 26 percent. In real terms, credit has grown by about 18.5 percent on average for the last two years. This expansion, however, seems to be more contained than in other emerging countries, which registered real credit growth of on average 21 percent for 2000–05.

6. **With financial intermediation already high, rapid credit growth rates has led to substantial accumulation of credit since 2002.** In terms of financial intermediation, household credit in particular, South Africa is in an intermediate range between emerging and mature economies (Figure III.1). Thus rapid rates of credit growth set South Africa on the high side of credit accumulation in proportion to GDP among emerging economies (Table III.1). The recent trend is, in fact, quite similar to the average of emerging European economies, where credit has grown particularly fast.

Figure III. 1. Household Credit in Percent of GDP, end-2005



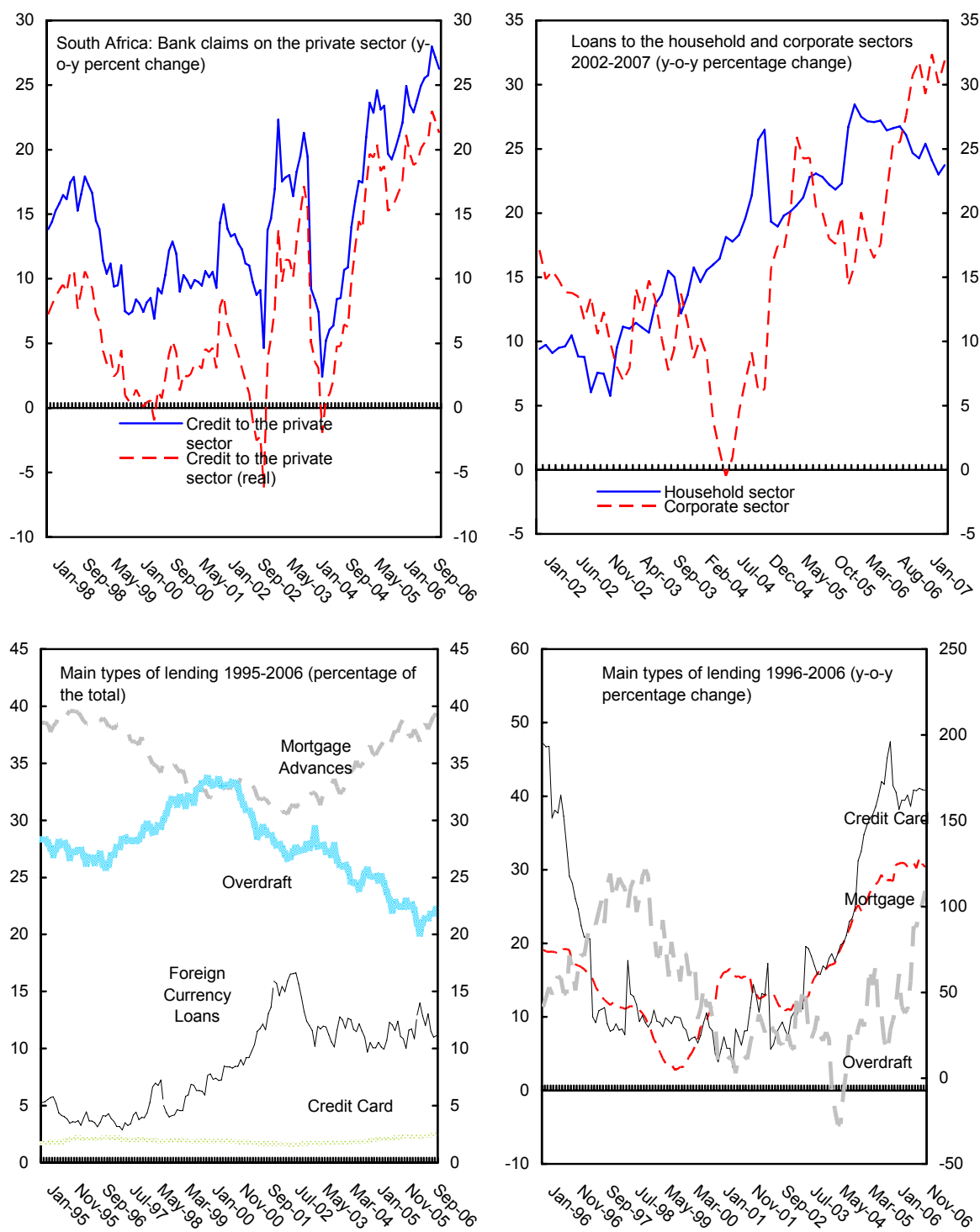
Source: IMF (2006)

Table III.1. Changes in the Ratio of Private Sector Credit to GDP in Emerging Economies

	2003	2004	2005	2006
Algeria	0.9	-0.1	0.7	0.7
Argentina	-4.5	-0.3	1.1	1.1
Bosnia&Herzegovina	5.2	2.8	7.6	3.1
Brazil	-0.4	-0.3	5.2	2.4
Bulgaria	7.7	9.4	7.7	4.2
Chile	-2.5	0.7	3.4	2.0
China	2.2	2.6	-3.0	-3.9
Colombia	-0.6	-0.1	1.8	0.9
Costa Rica	1.4	0.7	3.5	3.1
Croatia	2.6	3.6	4.8	6.8
Czech Republic	0.6	1.1	4.2	2.7
Dominican Republic	-6.2	-12.0	-0.8	-3.1
Ecuador	-1.4	2.5	2.9	2.7
Egypt	-0.8	-5.7	-3.8	-4.8
El Salvador	1.5	-0.5	1.0	0.3
Estonia	5.5	9.5	16.3	22.4
Guatemala	-0.3	1.0	0.4	3.7
Hungary	7.4	3.6	5.1	4.4
India	-0.6	5.3	4.3	6.7
Indonesia	2.0	2.7	1.3	1.3
Israel	-5.2	0.0	5.3	2.7
Jamaica	2.4	0.6	0.1	0.4
Jordan	-2.0	3.5	11.8	10.2
Kazakhstan	3.4	4.7	9.8	7.3
Korea	2.3	-4.4	2.9	5.5
Latvia	8.1	10.0	15.6	21.1
Lebanon	-3.6	-2.2	1.0	4.2
Lithuania	6.3	5.4	9.2	7.3
Malaysia	-3.5	7.3	5.9	6.6
Mexico	-2.1	-0.6	1.2	0.3
Morocco	1.5	0.8	5.5	-0.9
Pakistan	2.0	2.8	2.3	1.3
Panama	-3.2	0.7	3.8	3.3
Peru	-2.4	-2.0	1.0	-0.5
Philippines	-2.2	-0.9	-3.7	-2.3
Poland	0.6	-1.5	1.1	-0.2
Romania	3.6	1.9	4.7	6.2
Russia	3.2	3.2	1.5	2.4
Serbia	...	3.6	5.7	5.7
Slovak Republic	1.4	-0.7	8.4	0.9
<b>South Africa</b>	<b>5.5</b>	<b>2.1</b>	<b>4.2</b>	<b>8.2</b>
Sri Lanka	1.3	1.6	1.4	1.7
Thailand	-1.4	-3.1	1.2	-3.2
Tunisia	-0.7	0.8	1.2	1.0
Turkey	1.6	4.0	7.8	10.9
Ukraine	7.3	-2.4	8.5	11.4
Uruguay	-22.2	-14.2	-3.1	5.5
Venezuela	-1.2	2.5	3.0	2.6
Median	0.9	0.9	3.2	2.7
Average emerging Asia	0.0	1.4	1.3	1.5
Average emerging Europe	3.5	3.3	7.2	7.2
Average Latin America	-2.8	-1.4	1.6	1.6
Average Middle East & North Africa	0.1	0.6	3.6	2.4
Average all EMCs	0.4	1.0	3.8	3.7

Source: IMF Staff Calculations and International Financial Statistics.

Figure III.2. South Africa: Selected Indicators of Credit Growth



Source: South African Reserve Bank (SARB).



7. **Credit growth rates are particularly high for household debt, mainly due to the expanding mortgage loan portfolio.** Although credit card debt and mortgage debt are the segments showing the highest growth (Figure III.2), the pick-up in credit card debt was from a very low base, so mortgage loans are the main component of bank loans and advances.<sup>2</sup> From 1996 through 2006, mortgages explain about 40 percent of the growth in bank loans and advances and for 2004–06 more than 50 percent. The remainder is largely explained by overdraft and other loans (about 30 percent), dominated by corporate lending, which is traditionally a much more volatile component of credit in South Africa. Lending to corporations has picked up recently.

8. **Banks have financed the increase in credit growth by growing their deposit base.** Deposit growth has mostly tracked the increase in total credit, without undue tensions on the funding structure (Figure III.3), but since late 2003, lending has consistently outpaced deposit growth. The structure of deposits has barely changed: if anything time and long term deposits have increased their share. With an ample deposit base, banks did not have to increase much their recourse to foreign liabilities to fund credit growth. Although growing rapidly since 2006, banks' foreign funding is contained, at a low 4 percent of total liabilities.

9. **Deposit growth can chiefly be explained by substantial corporate savings, and rising household income.** Although they represent less than half of total credit, corporations appear as the chief contributor to deposit growth: corporate savings traditionally are relatively high in South Africa. Money market funds also represent a significant part of wholesale funding.

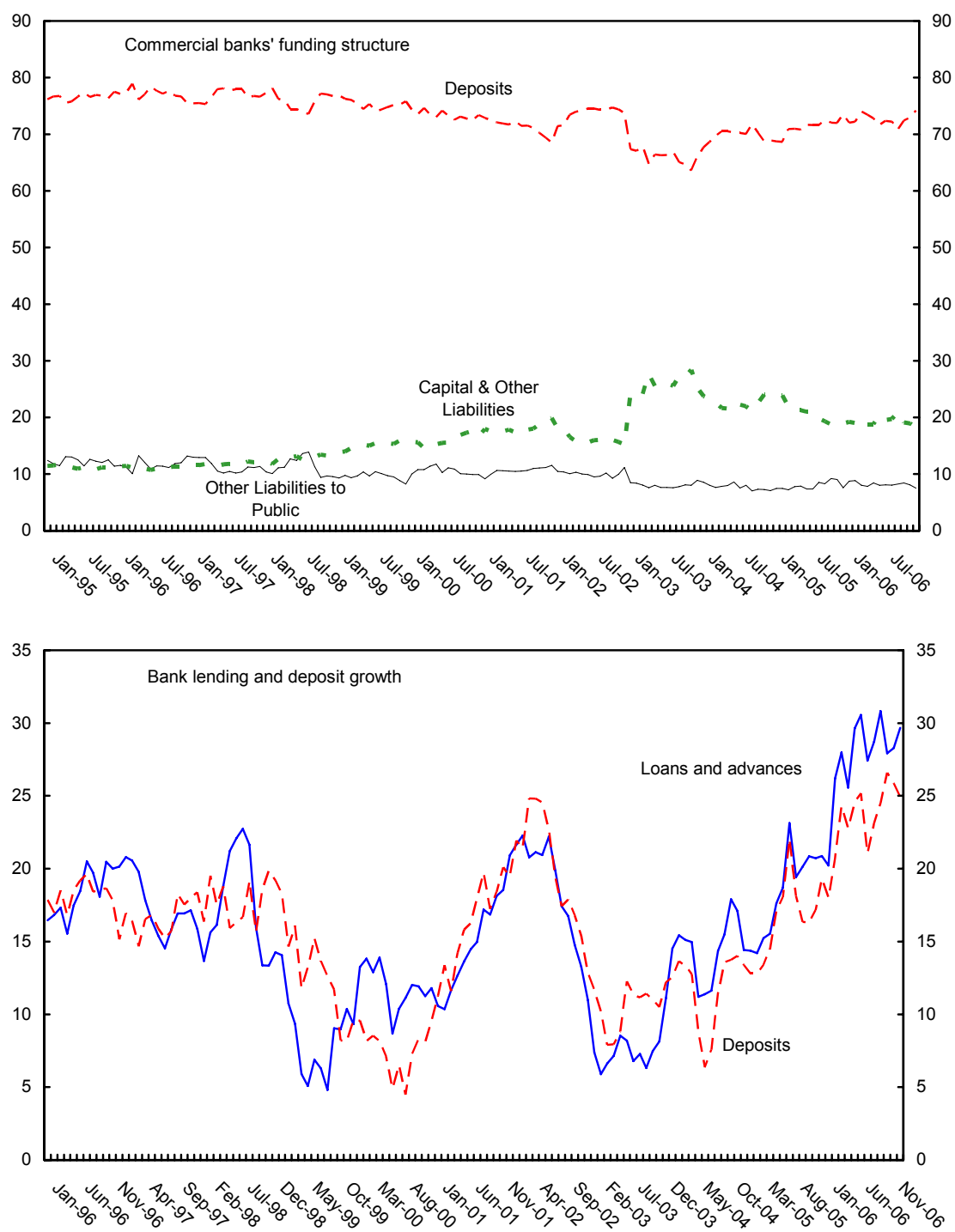
10. **Securitization has also helped South African banks to diversify their sources of funding and obtain longer-term funding at a low cost.** Though banks have traditionally been able to rely on their deposit base to fund credit growth, the recent credit acceleration and a strong demand for long-term financing (for mortgages and infrastructure) are pushing securitization and borrowing offshore. Local demand for securitized products from institutional investors reached its limits in 2006, enticing banks to benefit from the high appetite for South African risk abroad.<sup>3</sup>

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<sup>2</sup> Credit card debt amounts to only 2 percent of GDP.

<sup>3</sup> Securitization is well developed in South Africa although the stock of securitized products represents only the equivalent of 4 percent of the total loan book of South African banks. Residential Mortgage Based Securities is the dominant asset class, followed by Asset Backed Securities, Commercial Mortgage Backed Securities, and synthetic securitization. Credit card debt securitization is expected to rise.

Figure III.3. South Africa: Bank Lending and Funding



Source: SARB.

### C. What Might Explain the Surge in Credit in South Africa?

#### Learning From the Experience of Other Emerging Markets

11. **From other emerging markets, it appears that demand factors predominate among factors explaining household credit growth** (Box III.1). Recent studies of the experience of Eastern Europe (Cotarelli et al, 2005, Hilbers et al, 2005) identify the main determinants of rapid credit growth as lower inflation and interest rates, higher income levels, higher asset prices, and financial liberalization (Figure III.4).

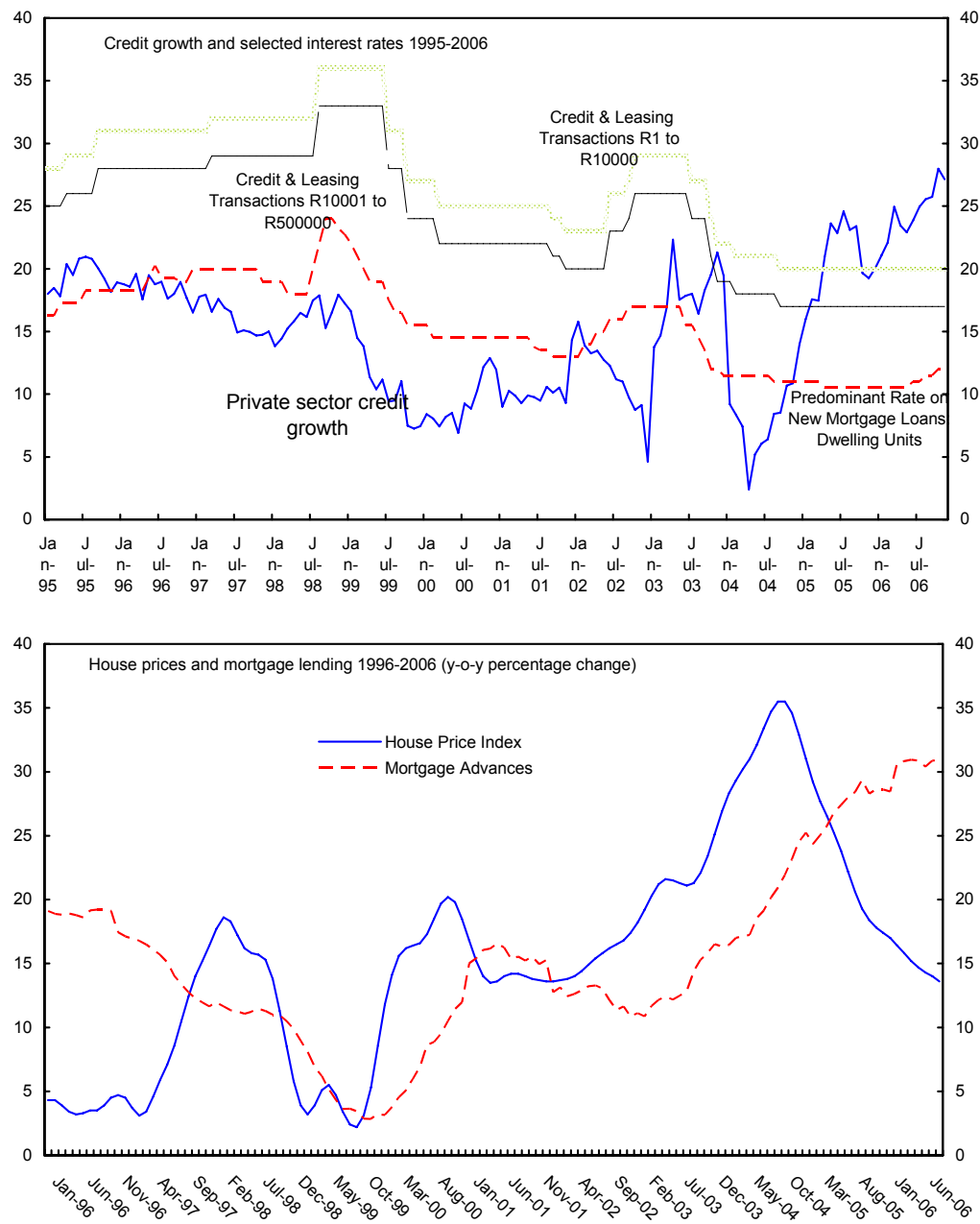
12. **To a large extent, these factors also apply to South Africa.** This is notably true of interest rates even if inflation has not been high in South Africa, and the decrease in interest rates (if significant) has not been as precipitate as the decline experienced in other countries. Aron and Muellbauer (2006) estimate the main determinants of the household debt-to-income ratio in South Africa to be the drop in interest rates, financial liberalization, income and population growth, and such components of wealth as housing, pensions, and directly held assets both illiquid and liquid.<sup>4</sup>

13. **However, some features identified in the recent literature on rapid credit growth are not relevant to South Africa** in particular the effects of foreign ownership of banks, foreign funding and dollarization apparent in Emerging Europe. Foreign ownership, and the associated significant boost to foreign funding, is limited in the South African banking system, even with the recent takeover of ABSA by Barclays. Moreover, most of the intermediation is done in domestic currency, so dollarization does not contribute to increased financial intermediation.

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<sup>4</sup> Housing prices in South Africa have increased cumulatively by 327 percent since 1997 to 2006, compared to 100 percent in the US, 252 percent in Ireland, 192 percent in the UK, and 173 percent in Spain. Price increases in South Africa started from a comparatively low base, however.

Figure III.4. South Africa: Selected Determinants of Credit Growth



Source: SARB.

### Box III.1. Factors in Household Credit Growth

Though demand and supply factors are difficult to disentangle empirically, the following can be gathered from the literature:

**Demand factors seem to predominate in rapid credit growth episodes.** Notable among them are lower inflation (income effect, reduced uncertainty); lower nominal and real interest rates; and higher incomes. In some cases, tax cuts have also been a factor. In Emerging Europe, credit, mostly in foreign currencies, boomed after inflation slowed because: (i) interest rates in local currencies were not having much effect on credit demand, given the high degree of dollarization in these economies; and (ii) trend real exchange rate appreciation, as expected, contributed to the demand for credit in foreign currency.

**Though less determinant, supply factors also matter.** Increases in the supply of bank loans are driven primarily by financial liberalization and deregulation and by advances in information technology and financial innovation, the latter being particularly relevant for mortgage finance (CGFS, 2006). Financial liberalization allows banks to extend credit to

- reduce constraints on households engaging in smoothing consumption when they expect significant income growth,
- reduce deposits required of first-time home buyers, and
- increase the availability of collateral-backed loans for households already possessing collateral.

Modifications in the behavior of banks in lending to both businesses and governments also seem to have an effect on credit to households. A reduction of corporate credit following recent emerging market crises or greater capital market access for business has made it possible to increase credit to households, as did a decrease in lending to governments. As secured credit, mortgage lending is also attractive to banks as it carries lower default risks than corporate or unsecured consumer credit.

**The fact that asset prices influence both credit supply and demand is also increasingly well-established.** Rising asset prices allow borrowers to take on more debt. This is especially relevant for mortgage lending because collateral makes a difference. It has been established that increases in house prices tend to drive credit growth, and not vice versa. Hoffman (2001) finds that house prices influence growth of private credit in a number of industrial countries, and Egert and others (2006) found a similar effect in several Central European countries. Gerlach and Peng (2002) find that in Hong Kong property prices determine bank lending, but lending does not appear to influence the short-run dynamics of property prices. In Ireland, Fitzpatrick and McQuinn (2004) found a long-term and mutually reinforcing relationship.

**A number of studies seek to identify equilibrium levels of credit and episodes of rapid credit growth that go beyond mere financial deepening or cyclical upturns.** Most studies try to determine the equilibrium level based on commonly identified supply and demand factors and identify periods of “excess” credit growth (e.g., in Cottarelli et alii, 2005). The aim is to assess whether countries have already overshot an equilibrium level of credit or are converging to a set level. Estimates are done with panel data, and most of them have focused on Emerging Europe and the convergence to a level of credit similar to that found in more mature European economies. In this framework, estimating the level of credit to which South Africa would converge is complicated by the need to identify a relevant group of mature economies to which South Africa is likely to converge.

## Development Issues and Access to Finance in South Africa

14. **South Africa exhibits certain features of a transition from one equilibrium level of credit to another.** For a long time a significant part of the population was denied access to financial services, with lasting effects on the structure of the financial system. Efforts to increase access, growth in household incomes, and the emergence of a black middle class are likely to affect financial intermediation. This raises two basic questions: Has increased access contributed to the growth in credit? And, is there room for more growth and is increased access likely to contribute to it?

15. **Despite notable progress, access to financial services is incomplete.** The South African government has done a lot to increase access (Box III.2); the share of the population excluded from formal financial services and without a bank account declined from 55 to 49 percent between 2004 and 2006 (Kirsten, 2006, and Finscope, 2006).<sup>5</sup> In 2006 about 1.5 million more adult South Africans opened new bank accounts, bringing the total to 15.9 million people. Greater bank usage appears to have been largely driven by the growth in Mzansi accounts (see Box III.2), now used by about 6 percent of the population. Enlarged use of banking services is also noticeable among middle-income individuals, with a fair amount of growth even in the more affluent segments.

### Box III.2. Government Initiatives to Improve Financial Access in South Africa

The South African government has tended to facilitate and regulate the provision of financial services rather than provide financial services directly. Recent major initiatives:

- The Financial Sector Charter (2003) is an agreement among major players in the financial sector that sets benchmarks against which financial services providers like banks and insurance companies can measure their progress on targets in six categories: empowerment financing, ownership and control, human resource development, access to financial services, procurement and enterprise development, and corporate social investment. The Charter has set ambitious targets; for instance, by 2008 each financial institution must provide access to financial services for 80 percent of the low-income population within 20 kms from where such population reside. One of the innovations has been the launching of the Mzansi account, a simple bank account available at the four major banks and Postbank and limited to basic deposit and payment facilities. So far, it has been highly successful; an estimated 60 percent of the holders are banking for the first time. Mzansi products are also available for insurance and money transfer.
- The planned Dedicated Banks and Cooperative Banks Bills Acts. The first creates a second tier of commercial banks subdivided into savings banks and savings and loan banks; the second gives legal standing to cooperatives in the banking industry. Both types of institutions are expected to deliver financial services to a wider population than currently served by traditional commercial banking services.

<sup>5</sup> The lack of access reflects to a large extent the lagging effects of apartheid. The black population accounts for 76 percent of the total population but only 56 percent of the total banked population, while the white population (about 9 percent of the population) accounts for an estimated 30 percent of the banked population (Finscope, 2006).

16. **It is hard to ascertain how much has increased access contributed to credit growth.** Scarcity of information on the level of debt by income category hampers thorough assessment of the impact of structural changes in South African society. In the most recent Finscope survey, only 11 percent of the adult population claim to have loans of any sort, and only 7 percent had a bank credit card. However, these numbers are likely to considerably underestimate the number of individuals effectively borrowing from financial institutions. Partial evidence suggests that debt exposure of the low income categories (Living Standard Measure 3 to 5) includes, in order of importance, most microlending, about 60 percent of retailer loans, and about 20 percent of credit card debt.<sup>6 7</sup> According to this evidence, credit to some of the lowest income categories is modest compared to total loans (3.6 percent) and to GDP (3.4 percent), probably because increased access for the lowest income segments has had relatively little impact on recent rapid credit growth.

Table III.2. South Africa: Population with Access to Banking Services  
(Percent)

	2004	2005	2006
By race			
Black	38	40	45
White	92	91	91
Coloured	41	43	53
Asian	83	68	58
By Living Standards Measure			
LSM 1-2	24	20	21
LSM 3-4	32	32	35
LSM 5-6	48	49	61
LSM 7-8	81	75	80
LSM 9-10	94	90	93
By personal monthly income			
No income	...	16	15
R1-R499	...	21	35
R500-R999	...	37	38
R1000-R1999	...	72	74
R2000-R3999	...	92	94
R4000-R7999	...	95	96
R8000+	...	97	98

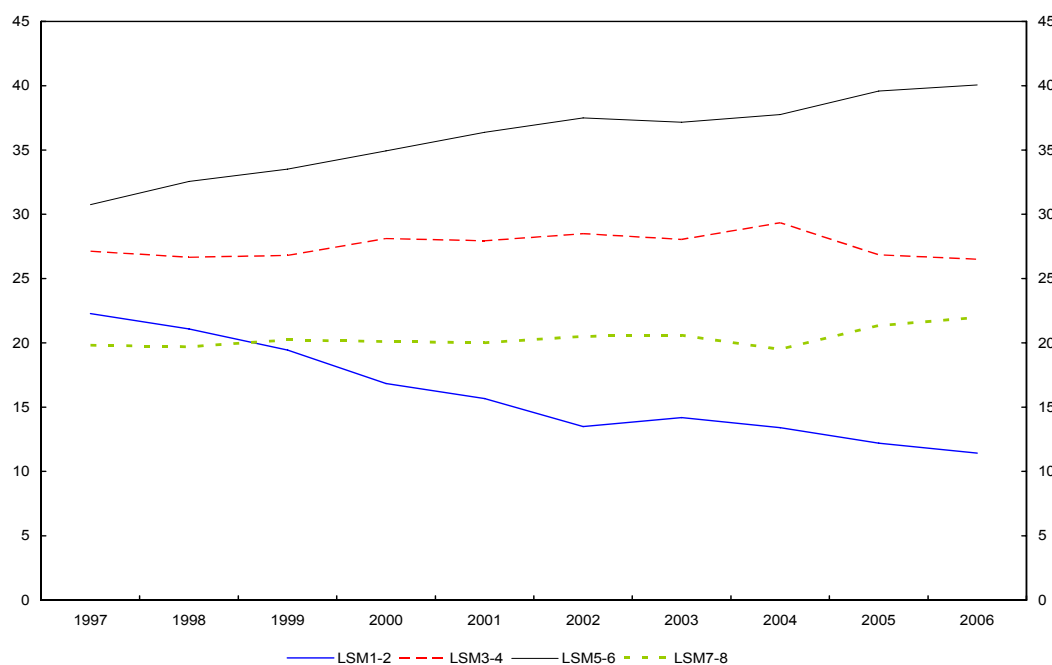
Source: Finscope (2006).

<sup>6</sup> Living Standards Measures from 1, lowest, to 10, highest, are calculated at the household level and are based on income data and other indicators.

<sup>7</sup> The importance of retailer loans for those with the lowest incomes is apparent from the fact that 20 percent of survey respondents had a retailer loan while 11 percent had a bank loan (Finscope, 2006). Within the FSC (“empowerment financing”), targets for bank lending to those with the lowest incomes, notably for housing, have also been set, but most banks find it difficult to reach them. Banks have also asked for compensation for the risk undertaken, but so far negotiations have not brought agreement.

17. **An expanding middle class and structural changes in the distribution of income are likely to sustain demand for credit.** Beyond the unbanked, individuals who already had some access have graduated from basic deposit services to full-fledged banking services, including credit. Growth of the middle class is apparent with the increasing share of LSM 5 to 8 (Figure III.5). With higher incomes come evolving needs, especially for housing.<sup>8</sup> Unless there is a significant slowdown in employment and income growth, demand for credit from these categories of the population is unlikely to soften in the medium term.

Figure III.5. South Africa: Evolution of Living Standards  
(Percent of the total population)



Source: Standard Bank.

#### D. Does Credit Growth Raise Stability Concerns?

##### Is the Stability of the Financial Sector at Risk ?

18. **The rapid increase in unsecured lending may cause limited stress in the financial sector but is unlikely at this stage to have systemic implications.** The authorities have expressed concern about a loosening of standards especially in unsecured lending and about

<sup>8</sup> Recent surveys by the University of Cape Town/Unilever Institute point to the emergence of a black middle class with rapidly growing spending power, especially since 2005. As their income grows, they desire to move from townships to suburbs, causing significant population shifts, shortages in low- and middle-income housing, and high demand for mortgage financing.



the vulnerability of new borrowers who have not yet experienced interest rate cycles.<sup>9</sup> The ratio of nonperforming loans (NPLs) in the segment of unsecured lending seems to have stabilized at a high level (as of April 2007, 5.2 percent) despite the rapid year on year increases in total credit card debt. Rapid increases in credit card debt have recently led to significant difficulties in countries like Korea and Taiwan, but given the limited size of the unsecured segment and the low penetration of credit card debt in South Africa, its rapid growth is unlikely to have systemic implications at this stage.

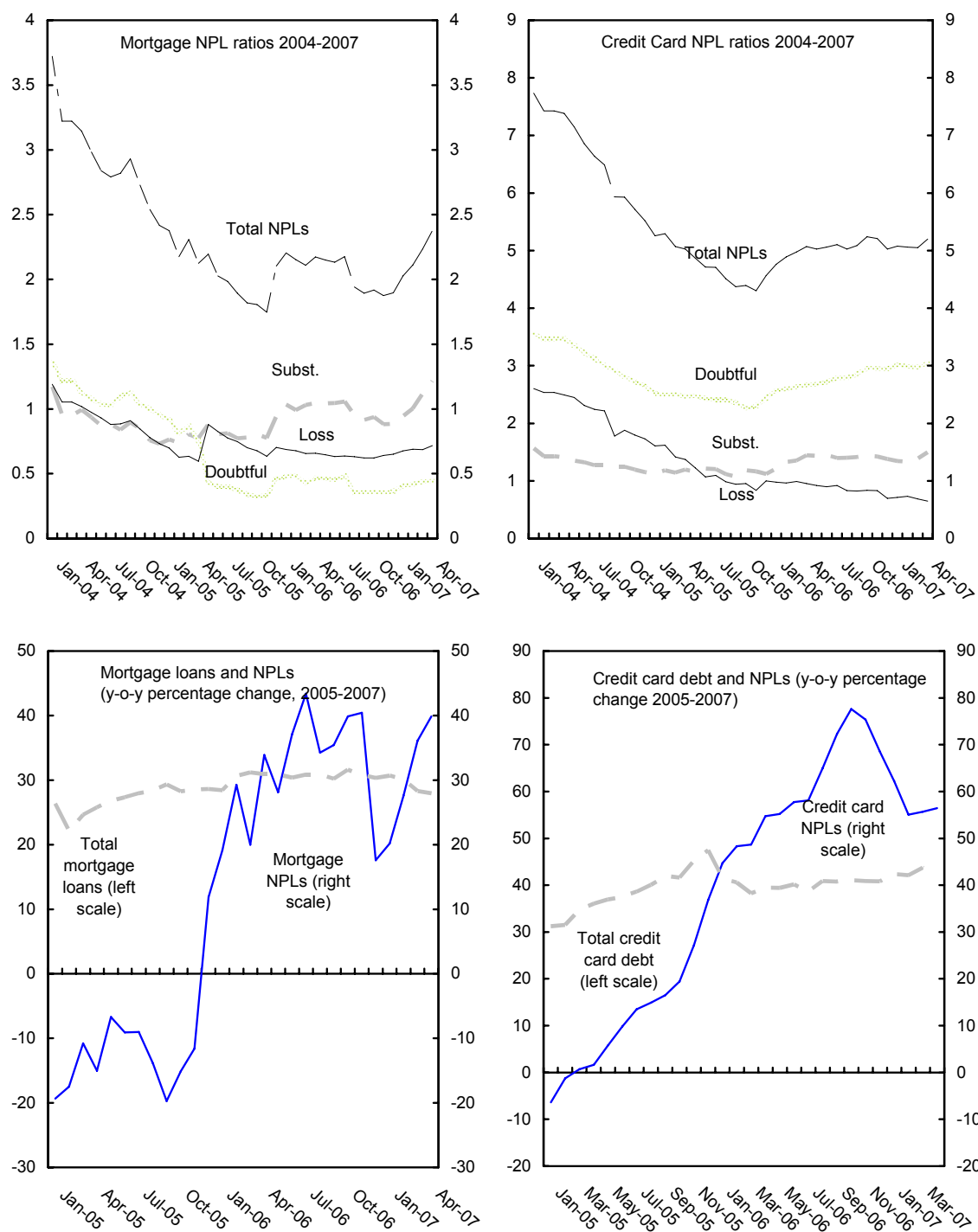
19. **Along with an increase in household indebtedness, certain aspects of the rapid growth in mortgages have sparked concern.** Valuation of real estate collateral seems relatively reasonable, with loan-to-value (LTV) ratios averaging 75–80 percent, but anecdotal evidence hints that the share of loans with LTVs of 95 percent and above has increased to about 40 percent of total loans in some banks. Other recent features include new products, such as interest-rate-only loans, the practice of approving loans for first home buyers at LTV rates of 108 percent to cover the transaction costs of buying a dwelling, and the creation by banks of property development companies because the supply of housing in some segments (notably for low and middle income housing) is not adequate to the demand.

20. **There has been a slight deterioration in mortgage asset quality indicators** (Figure III.6). Mortgage NPLs have been rising since the end of 2005 more steeply than they did in 2003–04. The rise occurs at a time of high economic growth and dynamic increases in employment, income, and housing prices. The rise in NPLs is masked by growth in credit, so that actual NPL *ratios* have not increased significantly and remain very low (2.4 percent as of April 2007, the same as in January 2005; the lowest level, 1.7 percent, was reached in November 2005). However, the increase in NPLs, especially in the substandard category, might reflect a return of these to more normal levels after falling to unusually low amounts.

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<sup>9</sup> Discussions of the authorities with the banks notably led to the establishment of a code of conduct among banks.

Figure III.6. South Africa: Mortgage and Credit Card Debt Performance



Source: SARB.

21. **Basic stress tests on the mortgage portfolio, using aggregate data, suggest that the banking system as a whole would be resilient to a large shock.** An update of the simple stress tests in IMF (2005) was conducted by including NPLs classified as substandard, a more comprehensive definition than the one adopted by South African authorities (Table III.3).<sup>10</sup> Large shocks were simulated (an increase of mortgage NPLs of the same magnitude as the shock experienced in 1999 and a large drop in housing prices). The stress test suggests that the banking system would be resilient, with an aggregate capital adequacy ratio above the minimum required (10 percent). The high valuation of collateral partly compensates for a slightly lower capital buffer compared to 2004. However, besides the simple framework used for this exercise, results inevitably suffer from the aggregation of data; a stress test performed on individual bank data is more relevant in assessing vulnerabilities and would help in reaching more definitive conclusions, as some banks may be more exposed to riskier mortgage loans.

Table III.3. Stress Tests on the Mortgage Portfolio

Base case and assumptions	End-2004 (Rand billions)	End-2006 (Rand billions)
Mortgage loans	406.2	680.8
NPLs <sup>1</sup>	9.7	12.9
NPLs in percent of mortgage loans	2.4	1.9
Collateral <sup>2</sup>	6.5	10.5
Collateral in percent of NPLs	67	81
Provisions held <sup>3</sup>	3.7	2.8
Provisions in percent of NPLs	38	22
Provisions required <sup>4</sup>	2.1	1.4
Over/underprovisioning (+/-)	1.6	1.4
<b>Scenario:</b>		
(1) New NPLs are equal to 7 percent of mortgage loans.		
(2) The collateral value of mortgages fall by 50 percent.		
New NPLs	28.4	50.8
New collateral	3.2	5.2
New provisions required <sup>4</sup>	21.8	22.7
New over/underprovisioning	-18.1	-20.0
Old capital adequacy ratio (in percent)	13.3	12.1
New capital adequacy ratio (in percent)	11.3	10.6

Sources: SARB, IMF (2005) and IMF Staff calculations .

<sup>1</sup>NPLs include substandard, doubtful and loss mortgage loans. Substandard loans were assumed to be equal to 40 percent of overdues (doubtful + loss) for the 2004 test.

<sup>2</sup>Specific provisions and the market value of collateral cover 105 percent of NPLs in the 2004 test.

<sup>3</sup>Specific provisions are equal to 38 percent of NPLs in the 2004 test.

<sup>4</sup>Provisioning rates are 20, 50, 100 percent for substandard, doubtful, loss loans, respectively.

<sup>10</sup> The official definition of NPLs comprises doubtful (overdue for 180 days unless well-secured or with timely realization of collateral) and loss loans. Substandard loans, which can be added into a broader definition of NPLs in line with international best practice, includes loans on which repayment of principal or accrued interest has been overdue for more than 90 days.

22. **Corporate credit is accelerating in South Africa but in general corporate indebtedness is limited** (Table III.4). The funding needs of businesses are increasing with dynamic aggregate demand. With a relatively limited degree of leverage and with rebounding investment rates, South African businesses are raising their demand for financing. This is primarily being met by the banking sector because the domestic corporate bond market, while expanding, lacks depth. Compliance with rules on large exposures does not appear to be an issue.

Table III.4. Selected Indicators for the Corporate Sector

(Annual growth unless otherwise indicated)	2005	2006			
	Q4	Q1	Q2	Q3	Q4
Credit to the corporate sector as percentage of GDP	28.9	30.8	30.7	31.9	33.8
Real gross Fixed Capital Formation	16.9	19.6	20.5	21.1	22.9
Credit to the corporate sector	19.7	20.1	17.5	25.5	31.8
Credit to the corporate sector as percentage of annualised profits	156.3	158.8	140.7	156.0	175.1
Net operating surplus (*)	12.0	15.8	16.0	15.9	17.7
<i>Memorandum items</i>					
Debt to asset ratio (in percent)	16.2	...	...	...	15.9
Debt to asset ratio (in percent), average emerging economies	20.4	...	...	...	...

Source: SARB and IMF Vulnerability Exercise.

(\*) Gross operating surplus minus depreciation.

23. **Besides credit risk, other types of risk often associated with rapid credit growth seem to be under control but warrant continued monitoring.** Liquidity risks have been well contained although the high share of corporates and institutional investors in the funding side of banks may complicate bank's liquidity management should depositors need to draw down rapidly on their facilities.<sup>11</sup> The incipient tendency to borrow abroad, supported by a favorable global liquidity environment, is likely to continue if deposits grow slower than credit, and in the absence of very developed corporate bond markets. Interest rate risks seem to be under control even as maturities lengthen on the asset side. Mortgages are 95 percent at floating rates and balance sheet management has improved notably with the emergent securitization of assets. Most banks boast sophisticated risk management techniques, increasingly so in the run up to the adoption of Basel II in 2008 (for instance, large banks have applied to adopt the Internal Ratings Based approach). Overall, strong prudential and monitoring frameworks seem to be among the conditions ensuring a relative protection to currency and banking crises after an acceleration of credit growth (Box III.3).

<sup>11</sup> In light of the increased needs for long term funding and the associated maturity mismatches, the SARB has increased its focus on liquidity risk management and has engaged banks on the issue (SARB, 2007c).

### Box III.3. How Do Credit Booms End?

Asian countries before the 1997 crisis, Sweden and Finland before the early 1990s, and Portugal before euro adoption and the abrupt slowdown in growth in the early 2000s all went through a period of financial market liberalization; rapid credit growth, partly financed by foreign capital inflows; accelerating domestic demand; rising inflation and asset prices; appreciating real exchange rates; and widening external imbalances.

Excessive cyclical movements, which can be described as “credit booms,” are characterized by an expansion that is unsustainable and eventually collapses. IMF (2004) defines a credit boom as a credit expansion that exceeds a country’s credit fluctuations around trend. Credit booms tend to be much less common than simple episodes of rapid credit growth; tend to be synchronized across countries (East Asia before 1997, Latin America during the debt crisis of the 1980s); often coincide with either a consumption or investment boom; and are often associated with banking and currency crises. Fitch Ratings has calculated that about 70 percent of banking crises since the 1980s were preceded by overlending; most crises happened in countries characterized by weak banking and prudential systems. However, as Gourinchas, Valdes, and Landerretche (2001) point out, while the probability of a lending boom occurring before a financial crisis may be quite high, this does not tell us much about the converse, the probability that a financial crisis will follow a lending boom. Among factors increasing the likelihood of both currency and banking crises after credit booms are high real exchange rate appreciation and current account deficits, balance sheet dollarization, and weak banking and prudential systems.

### Is Macroeconomic Stability at Risk ?

**24. Risks in household debt (mostly mortgages but also credit card debt) and household balance sheets could also have macroeconomic implications.** One significant macro risk is the impact on domestic demand induced by borrower’s difficulties. Such a situation would occur if interest rates have to rise substantially, for example because of an abrupt weakening of the currency in light of rapidly deteriorating external accounts.<sup>12</sup> In South Africa debt has reached record highs, household saving ratios are low, and the household debt-to-income ratio reached 73.8 percent of disposable income in 2006 (Table III.5) and 76 percent in May 2007. The gross saving ratio of households declined to 1.5 percent in 2006 and if depreciation is taken into account is for the first time negative. Debt service-to-income was relatively moderate by South African standards at 9 percent of disposable income at the end of 2006—well-contained compared with the previous high of 14.5 percent toward the end of 1998. However, if debt-to-income is on the low side compared with industrialized countries, debt-service-to-income for households is among the highest, outpaced only by Australia and New Zealand (while the latter two countries boast

<sup>12</sup> Some studies have also found a high influence of credit growth on external account developments, potentially increasing macroeconomic vulnerability, for instance for Bulgaria, Romania and Ukraine, (Duenwald, Gueorguiev and Schaechter, 2005).

much higher levels of debt).<sup>13</sup> This is largely explained by the higher interest rates on mortgage and consumer debt.

Table III.5. South Africa: Selected Indicators for the Household Sector

(Annual growth unless otherwise indicated)	2005	2006			
	Q4	Q1	Q2	Q3	Q4
Household disposable income	10.2	10.1	11.0	12.0	12.3
Household financial assets (*)	20.5	26.6	26.9	17.8	18.8
Household net wealth (**)	18.9	22.7	22.6	14.9	16.3
Real household consumption expenditure	6.0	6.5	7.1	7.5	8.0
Credit to households	22.3	27.5	27.2	26.7	24.3
Household debt to household disposable income	67.0	69.4	70.8	73.0	73.8
Financing costs on disposable income (income gearing)	7.2	7.3	7.4	8.2	9.0
Debt to total assets (capital gearing)	19.2	18.9	19.2	20.1	20.1

Source: SARB and Bureau of Economic Research.

(\*) Household deposits in financial institutions, share in pension funds and a proxy for the holding of shares.

(\*\*) Fixed assets and financial assets less liabilities.

25. **In the aggregate, high net household wealth seems to act as a significant buffer.** Household assets, mostly linked with house ownership and pensions, are substantial in South Africa and may be a buffer against debt-servicing difficulties. South Africa's household indebtedness is between that of France and Italy (Table III.6), and its net financial wealth, though low compared to mature economies, is high by emerging economy standards, confirming its position between emerging and mature economies.<sup>14</sup> Over a long period there have been considerable changes in the composition of net wealth: (i) pension wealth has risen; (ii) there has been a trend decline for directly held securities, though equity prices have recently surged; (iii) housing wealth has recently recovered after a decline; and (iv) as household debt has risen, liquid assets have been declining.<sup>15</sup> The high degree of pension wealth may not fully support the resilience of households to large shocks because capacity to tap rapidly into these assets may be limited or costly.

<sup>13</sup> Comparative data on household debt and debt service to income ratios in emerging economies is scarce.

<sup>14</sup> Estimates for net financial wealth point to a very high level of financial assets in South Africa compared to emerging economies, at the level of the United States (IMF, 2006). There are significant differences in measurement, however; in South Africa the high level of assets held in pension funds (about 170 percent of disposable income) may explain the gap with other emerging economies.

<sup>15</sup> For a detailed analysis of South African household balance sheets, see Aron, Muellbauer and Prinsloo (2007). The decline in holdings of liquid assets is explained in part by negative after-tax real interest rates. The relatively high level of investment by households in pension funds and long-term insurance is related to the well-developed contractual saving and investment industry in the country.

Table III.6. South Africa and Selected Industrial Economies: Household Debt and Net Wealth  
(Percent of disposable income)

	Household Debt			Net Wealth		
	1995	2000	2005	1995	2000	2005
United States	93	107	135	510	575	573
Canada	103	114	126	370	527	640
Japan	130	136	132	736	750	725
Australia	83	120	173	514	567	734
New Zealand	96	125	181	472	445	670
Denmark	188	236	260	357	524	562
Germany	97	111	107	541	575	578
France	66	78	89	461	547	752
Finland	64	66	89	202	302	319
Ireland	...	81	141	...	618	775
Italy	32	46	59	702	820	936
Netherlands	113	175	246	369	528	515
Spain	59	83	107	540	646	935
Sweden	90	107	134	262	387	436
United Kingdom	106	118	159	569	750	790
<b>South Africa</b>	<b>62</b>	<b>55</b>	<b>69</b>	<b>288</b>	<b>282</b>	<b>347</b>

Sources: Girouard et al. (2006), Aron et al. (2007).

26. **What matters fundamentally, however, particularly in South Africa, is the distribution of debt across income categories.** Debt distribution has important implications for the sensitivity of the economy to shocks in income, interest rate, and house prices (Debelle, 2004). High aggregate indebtedness may not necessarily imply that there is a risk to macroeconomic and financial stability, especially if the distribution of debt is biased toward households that have greater payment capacity and a buffer to withstand shocks. Similarly, low aggregate indebtedness may mask vulnerabilities if debt accumulation is skewed toward low-income groups. Without information on distribution of debt across the population and all levels of income, assessing the weight of debt service on households must be subject to limitations—especially in South Africa, where large income inequalities are still the legacy of apartheid and a large portion of the population is still not indebted.

27. **Anecdotal evidence from banks indicates that the household debt-to-income ratio varies substantially with income levels.** The ratio seems to be higher at upper-income levels, mostly because these households have higher mortgage debt. The variation in debt-service-to-income ratios is lower as households that do not have mortgage loans often rely on consumer debt, which bears higher interest rates. A risk may arise in South Africa at both ends of the income scale if those households lack significant buffers to cope with unexpected shocks: long-time bank customers whose increasing debt load is highly dependent on

collateral valuation, and new borrowers with a poor credit culture and growing debt at high interest rates.<sup>16</sup>

### **What Are the Policy Options ?**

**28. International experience indicate that the optimal policy response depends on which problems arise from credit growth:**

- Macroeconomic imbalances would warrant a monetary or fiscal policy response.
- If financial sector risks are identified, prudential regulation should be tightened.
- Welfare risks to new borrowers and poorer segments of the population call for enhancements to the consumer protection and prudential frameworks.

Often, ad hoc combinations of these policies are adopted as a “second best” (Figure III.7).

**29. In South Africa, the National Credit Act seeks to enhance the regulatory framework for consumer credit and address welfare risks.** The act, signed in March 2006 to take effect in June 2007, regulates the granting of consumer credit by all credit providers, including microlenders, banks, and retailers. It introduces formal bodies, the National Credit Regulator and the National Consumer Tribunal, to achieve these goals. The act replaced the Usury Act (1968) and the Credit Agreements Act (1980). The National Credit Act is expected to lengthen slightly the foreclosure process because it introduces a debt-counseling procedure that includes judicial mechanisms. However, it will also bolster the ability of banks to control their exposure to household risks while ensuring greater consumer protection. In this respect, it responds to concerns expressed about the social consequences of rapid growth in unsecured lending to inexperienced borrowers.<sup>17</sup>

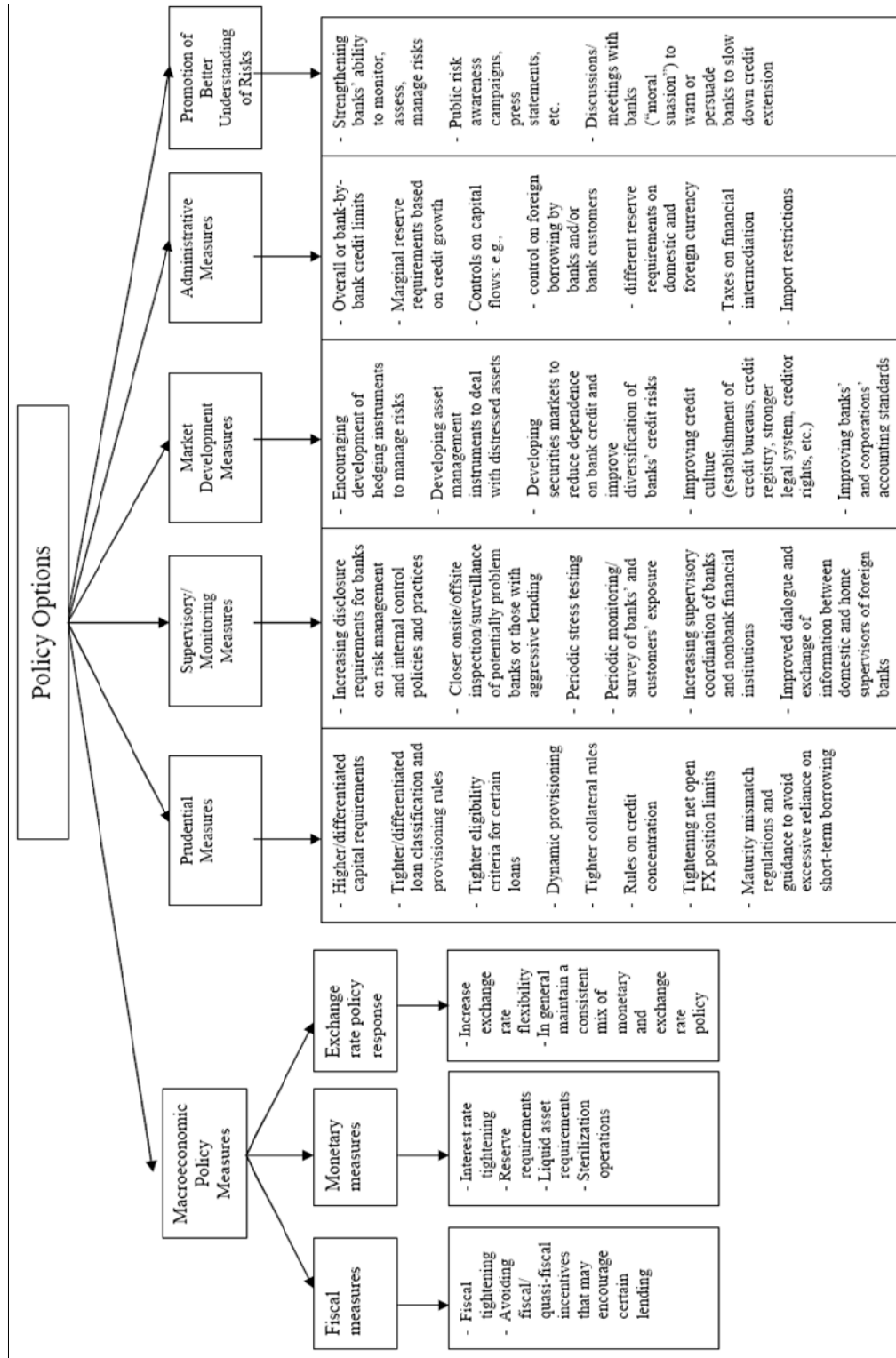
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<sup>16</sup> Recent survey results (Credit Suisse Standard Securities, 2007) suggest that most of the growth in indebtedness has occurred in the middle class segments of the population and that higher income households appear to have either kept their debt exposure constant, or even decreased their exposure somewhat.

<sup>17</sup> Although unsecured lending is not large enough to lead to systemic concerns in the financial system, the social implications are significant when a large number of small borrowers may be affected, not only in the commercial banking sector but also in retailer loans and microlending. The National Credit Regulator has commissioned a study based on surveys to assess credit extension to households (National Credit Regulator, 2007).



Figure III.7. Policy Options in Responding to Rapid Credit Growth



Source: Hilbers et al. (2005).

30. **In light of rapid credit growth, financial sector surveillance could be further enhanced by:**(i) comprehensive and regularly conducted stress tests on credit, liquidity, interest rate, and foreign exchange risks for individual banks; (ii) requirements that banks provide household indebtedness data by income category, and periodic analyses on the associated aggregate trends in the financial system;<sup>18</sup> and (iii) improved analysis of the links between the mortgage market and consumption—as significant wealth effects may be at play. A recent survey (Credit Suisse Standard Securities, 2007) suggests that mortgage equity withdrawal is growing, but the evidence on refinancing and equity withdrawal is mostly anecdotal as no comprehensive study on these issues have been undertaken so far.

31. **Increased monitoring can be complemented by a tightening of prudential regulation, particularly on certain segments of bank lending, such as mortgages.** An increase in capital adequacy requirements is unlikely to have any significant effect on the concerns that have been identified and would be affecting all types of credit across the board. A change of risk weightings for certain types of loans must be justified in the context of Basel II, but is entirely possible within a standardized approach. Several measures could also be introduced based on international experience:

- *A maximum LTV ratio.*<sup>19</sup> Currently any portion of a loan above an LTV of 80 percent is risk-weighted at 100 percent instead of 50.
- *Rules on debt-to-income ratios.*
- *A requirement for mortgage insurance above a certain threshold.*<sup>20</sup>

A tightening of prudential regulations, even moderate, needs to take into account compliance costs for banks for the measures to be fully efficient.

32. **As some regulatory features may contribute to rapid credit, tightening prudential regulations may also help tame the pace of credit growth at the margin.** Relatively loose requirements on mortgages and some other types of lending have probably contributed to the increased supply of credit to the economy. Introducing tighter

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<sup>18</sup> Surveys of households (such as in the U.S. or Spain). Sweden requires banks to regularly provide data on household debt to income by income category.

<sup>19</sup> Countries that have recently introduced maximum LTVs include Korea, Thailand, Hong Kong, and the Philippines. Similarly, Australia is considering a tiering of risk weights for housing loans based on the LTV. Under the standardized approach of Basel II, and considering that the risk weight for mortgages is lowered to 35 percent, a higher risk weight on mortgages can be considered. New Zealand is envisaging similar measures in the context of Basel II.

<sup>20</sup>In Spain, for mortgages with an LTV above 80 percent, mortgage insurance (offered by credit institutions) or additional guarantees are required. In Canada and Australia, similar regulations have been put in place.

requirements at the height of the economic cycle is also more advisable than in a downturn, because significant procyclical elements are already present.

#### Box III.4. Country Experiences with Measures to Address Rapid Credit Growth<sup>1</sup>

A variety of measures have been implemented by countries that have experienced rapid credit growth, notably in Emerging Europe where that has been widespread:

- **Interest rate policies.** If credit growth is fuelled by capital inflows, interest rate policies may have adverse effects by fuelling further capital inflows. In Iceland, for instance, monetary policy has had limited success in containing credit growth due to Iceland's open capital account.
- **Monetary measures,** such as changes in reserve requirements and introduction of liquidity requirements. A few countries (e.g., Serbia, Croatia) have widened the base for reserve requirement calculations to include leasing companies or off-balance sheet guarantees.
- **Fiscal policy.** Romania, Croatia, and Bulgaria are among the countries that have tightened fiscal policy or ceased offering fiscal incentives in the form of mortgage interest deductibility, and mortgage subsidies have been reduced. Denmark has abolished the subsidies.
- A majority of countries have taken **prudential measures** by tightening regulation, such as
  - classification and provisioning rules
  - dynamic provisioning (Spain), with higher provisioning in good times to avoid procyclicality
  - higher capital adequacy requirements and risk weightings (in India and Malaysia for housing loans)
  - close monitoring of loan underwriting or granting procedures
  - maximum LTVs (Poland, Hong Kong, Romania, Iceland, Korea, Philippines, Thailand)
  - surveys of direct or indirect bank foreign exchange exposures and enhancements to the supervision of nonbank financial institutions (Ukraine, Serbia, Croatia).
- **Better communication with the public and moral suasion with banks.** This has been used in Croatia, Hungary, Poland, and Malaysia.

So far, mainly because most of the measures were undertaken only recently, there is little empirical evidence on which measures are most effective in taming credit growth. In many of the countries concerned, credit growth shows few signs of abating; in a few others, despite some indications of a slowdown, the rate of growth remains high (e.g., Ukraine, Moldova); in a few, like Bosnia, the measures seem to have been effective. The persistent strength of foreign currency-denominated lending in several countries, however, has kept banks vulnerable to direct or indirect foreign exchange rate risk.

Efforts to slow down credit in emerging economies have often been frustrated by:

- the limited impact on sources of bank funds for lending, given banks' ability to obtain funding through rapid deposit growth and borrowing from abroad (e.g., from parent banks in countries where foreign banks have a large presence).
- the circumvention of regulations by borrowers who borrow directly from abroad or from less-regulated nonbank financial institutions and by banks through window-dressing. In EU accession countries, integration of domestic markets into the euro market brought a general easing of monetary conditions that likely stimulated credit demand. The euroization of the economies, a lack of effective instruments of monetary control, and weaknesses in the monetary transmission mechanism have limited the capacity to effectively use monetary measures. Direct credit controls were circumvented by direct business borrowing from abroad or from unregulated leasing companies.

<sup>1</sup> Based on Hilbers et al. (2005) and the IMF Nordic-Baltic Regional Financial Sector Project.

## E. Conclusions

33. **Rapid credit growth responding to familiar factors in South Africa is likely for the medium term.** If there are no large macroeconomic disruptions, large shocks on employment and income, or dramatic increases in interest rates, credit growth in South Africa could be expected to continue on a vibrant pace. Besides responding to factors common in emerging economies, the specific economic and social structure of the country supports continued financial deepening. Financial sector stability does not seem at immediate risk, and the National Credit Act is an important step in placing credit growth on a sound footing. Moreover, the economic context is highly favorable for the authorities to avoid credit booms that would result in adverse macroeconomic and social implications. The surveillance and research agenda is rich, with the continued need to improve the monitoring of household indebtedness by income category predominant in the short term.

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## IV. ASSESSING MACROECONOMIC VULNERABILITIES IN SOUTH AFRICA: AN APPLICATION OF THE BALANCE SHEET APPROACH<sup>1</sup>

### A. Introduction

1. **Thanks to sound policies and a favorable external environment, South Africa has enjoyed a period of strong economic growth that has led to important changes in the balance sheets of the aggregate economy as a whole and of particular sectors.** Optimistic prospects about future growth and rates of return are reflected in the behavior of foreign investors and domestic economic agents. In recent years net capital inflows have increased significantly, the stock and real estate markets have grown fast, and credit to the private sector and domestic absorption have increased markedly. These changes have affected the economy's aggregate balance sheet, as well as those of its subsectors, with implications for its vulnerability to shocks.
2. **This chapter uses the balance sheet approach (BSA) to analyze macroeconomic vulnerabilities in South Africa between 2002 and 2005.** It discusses the financial position of the economy and its main sectors and the sectors' exposure to changes in exchange rates and foreign interest rates.
3. **The chapter is organized as follows.** Section B briefly reviews the literature on the BSA. Section C describes macroeconomic developments in South Africa between 2001 and 2006. Sections D and E analyze the balance sheet of the aggregate economy and of its subsectors. Section F examines the sensitivity of net worth and liquidity indicators to exchange rate and foreign interest rate shocks. Section G summarizes the findings of the analysis.

### B. The Balance Sheet Approach

4. **The BSA emerged as a useful framework in understanding financial crises after the earlier models proved unable to explain the crises of the 1990s.** The first-generation currency crisis models link balance of payments crises to incompatibility between macroeconomic fundamentals and an exchange rate peg (Krugman, 1979). The second-generation crisis models suggest that a crisis could be triggered by an endogenous policy response when the authorities consider that the costs of keeping a pegged exchange rate outweigh the benefits. The models recognize the role of self-fulfilling speculative attacks in triggering crises (Obstfeld, 1986). While the Asian financial crisis of the late 1990s had some features of a self-fulfilling panic (Sachs and Radelett, 1998), it brought to the forefront the role of balance sheet weaknesses in the financial and corporate sectors in causing financial

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<sup>1</sup> Prepared by Mwanza Nkusu and Charles Yartey.

crises. In particular, debt exposure and currency imbalances in the balance sheets of private entities can adversely affect market confidence and heighten an economy's vulnerability to a banking or a currency crisis.

5. **The BSA can provide insights into a country's vulnerabilities.** While the traditional analysis of financial crises relies on the evolution of flow variables, the BSA focuses on stock variables. Assessing mismatches in individual sectors' balance sheets and linkages among sectors helps understand how shocks can affect the liquidity or solvency of one sector and be transmitted to other sectors, possibly endangering the financial health of the whole economy.

6. **There are, however, limitations to the BSA as an effective framework for risk analysis.** Because it is static, the BSA should be complemented with flow variables for a fuller vulnerability assessment. Also, it does not include real assets and off-balance sheet liabilities, which may affect a sector's vulnerability to crisis. Moreover, the BSA cannot provide a quantified forward-looking probability of default. Such assessments could be obtained from the contingent claim approach that integrates balance sheet information with market prices and uncertainty measures (Gapen et al., 2005).

### C. Macroeconomic Developments in South Africa and Balance Sheet Implications

7. **South Africa's macroeconomic performance has been strong in recent years.** Economic growth has been robust and inflation has been low (Figure IV.1). Real GDP growth averaged almost 4 percent during 2001–06 and 5 percent in the last three years, when growth has been driven by strong domestic absorption, with private consumption and investment spending supported by low interest rates and optimism about future growth. Household consumption was also boosted by rising incomes and wealth effects from buoyant housing and stock prices. Public sector investment and consumption have also grown at healthy rates.

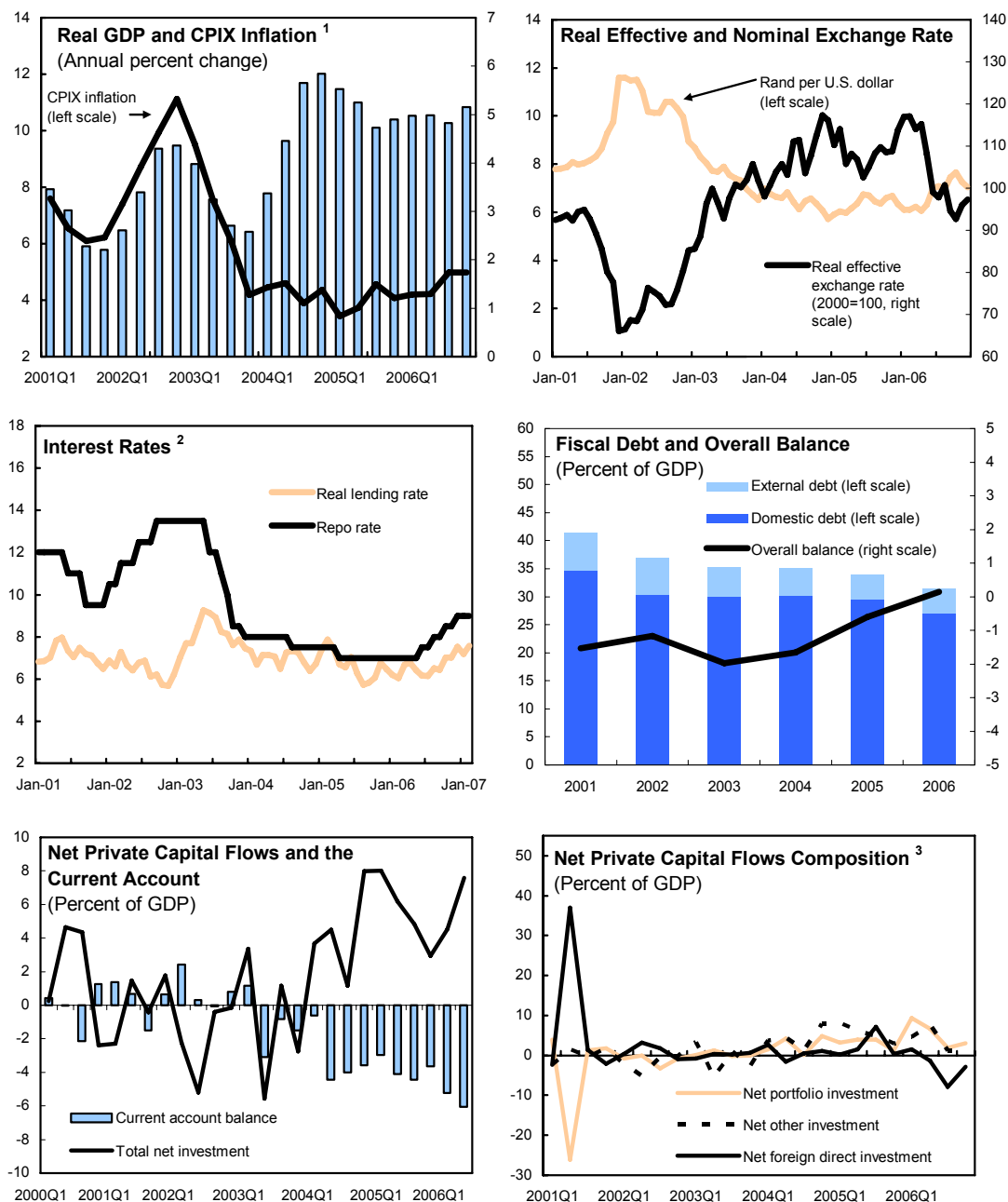
8. **Thanks to policy reforms and strong economic growth, South Africa's fiscal performance has improved.** Reforms implemented over the last decade have enhanced fiscal management, and lowered public indebtedness. Reflecting primarily robust revenue performance, the fiscal balance strengthened to a surplus of 0.6 percent of GDP in FY 2006/07 from a deficit of 2.3 percent three years earlier, and public debt fell to 31.5 percent of GDP in 2006, from almost 43 percent in 2000.

9. **Low interest rates and rising wealth from booming asset prices have fuelled credit to the private sector.** The Johannesburg Stock Exchange (JSE) All-Share index increased by 43 percent in 2005 and 38 percent in 2006. The house price index (ABSA) increased by an annual average of 23 percent in 2005 and 15 percent in 2006. Credit to the private sector increased by an annual average of just over 20 percent in 2005 and 2006.



10. **Rising domestic demand has been reflected in the deterioration of the current account balance.** The current account balance shifted into a deficit in 2003 and has been widening since, reaching 6.5 percent of GDP in 2006. The deficit has been more than financed by large nondebt-creating portfolio flows, enabling a steady increase in international reserves.

Figure IV.1. South Africa: Macroeconomic Developments



Sources: National authorities, International Financial Statistics, and Information Notice System.

<sup>1</sup> CPIX is CPI inflation excluding the interest on mortgage bonds.

<sup>2</sup> The real lending rate is calculated by subtracting the end of period CPIX annual inflation from the prime lending rate.

<sup>3</sup> The spike in 2001Q2 in the components of net private capital flows is a result of the US\$18.7 billion privatization of the De Beers company.

11. **Gross international reserves have increased significantly in recent years, contributing to an improvement in the rating of the country's debt.** The increase in reserves has led to improvements in imports cover and other reserves adequacy metrics. As of end 2006, gross international reserves represented 3.3 months of imports and over one and a half times the level of short-term foreign-currency-denominated external debt at residual maturity. The stronger foreign exchange reserves position, together with the improvement in other economic fundamentals, encouraged the three major credit rating agencies to upgrade the ratings of South Africa's debt.

12. **The recent changes have altered sectoral financial positions and the relations between sectors.** A significant increase in household indebtedness, mostly from mortgage loans, has been associated with a greater exposure of banks to changes in property prices. The liabilities of domestic residents to the rest of the world (ROW) have increased in line with the widening current account deficit. The impact of these changes on aggregate and sectoral balance sheets and on the economy's sensitivity to shocks will be analyzed below.

#### **D. Balance Sheet Matrices For South Africa**

##### **The Data**

13. **Mathisen and Pellechio (2006) outlined the major data sources for balance sheet analysis.** These sources are: the Standard Report Forms (SRF) for monetary and financial data, the Quarterly External Debt Statistics (QEDS), the Joint External Debt Hub (JEDH), the Coordinated Portfolio Investment Survey (CPIS), and the International Investment Position (IIP).<sup>2</sup> More details on these sources are in the Appendix I.

14. **Balance sheet matrices for South Africa were constructed for 2002 -2005, a period of continuing growth and associated change in sectoral balances.**<sup>3</sup> Intersectoral claims and liabilities are displayed by maturity and currency. The economy is divided into six main sectors: (1) the central bank (the South African Reserve Bank, SARB); (2) the nonfinancial public sector (NFPS) comprising the central government, the state and local governments, and the nonfinancial public enterprises; (3) the financial sector, grouping deposit taking institutions and other financial institutions (nonbanks); (4) the nonfinancial

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<sup>2</sup> In addition, we have used the SARB's *Quarterly Bulletin* to obtain data on short-term public sector marketable debt.

<sup>3</sup> These are matrices of financial claims of each sector on the other sectors of the economy. Mathisen and Pellechio (2006) provide a detailed matrix for South Africa in 2004. The present paper puts together matrices for earlier years using final data and for 2005 by estimating the 2005 IIP using the 2004 IIP (adjusted for exchange rate changes) and flows from the 2005 balance of payments statistics. The appendix I provides both summary net position matrices and detailed gross claim and liability matrices for South Africa.

corporate sector ; (5) other domestic residents (including households); and (6) nonresidents (the ROW—rest of the world). The first two sectors, SARB and NFPS, can be consolidated roughly into a public sector, and the rest of the domestic sectors into the private sector (these labels are approximate, as some financial public entities end up in the “private” sector).

15. **The matrices display intersectoral claims and liabilities.** The five domestic sectors have claims and liabilities against one another and the ROW.<sup>4</sup> When their balance sheets are consolidated to generate the country’s aggregate balance sheet, the intersectoral assets and liabilities are netted out, leaving the aggregate position vis-à-vis the ROW. That deserves particular attention because financial crises are triggered or exacerbated by a reversal of external capital flows. Tables IV.1 and IV.2 are summary matrices for 2002 and 2005.

Table IV.1 South Africa: Intersectoral Liabilities in Percent of GDP, December 2002

	Central bank	Non Financial Public Sector	Financial Sector	Nonfinancial Corporations	Other Residents	Nonresidents	Total
Central bank		4.72	1.22	0.00	0.00	5.65	11.60
Non Financial Public Sector	0.29		6.73	0.00	0.00	0.88	7.89
Financial Sector	6.03	43.94		82.65	32.54	23.73	188.89
Nonfinancial corporations	0.00	0.00	37.46		--	24.50	61.97
Other resident sectors	0.02	0.00	133.55	--		--	133.57
Nonresidents	1.96	8.93	7.77	22.14	--		40.80
Total	8.30	57.59	186.73	104.79	32.54	54.76	

Notes: Cells indicate the liability of a column sector to a row sector as a percentage of GDP.

Source: Standardized report forms for monetary and financial data, Joint External Debt Hub, Coordinated Portfolio Investment Survey, and Quarterly External Debt Statistics.

Table IV.2 South Africa: Intersectoral Liabilities in Percent of GDP, December 2005

	Central bank	Non Financial Public Sector	Financial Sector	Nonfinancial Corporations	Other Residents	Nonresidents	Total
Central bank		1.04	1.01	0.00	0.00	8.48	10.54
Non Financial Public Sector	2.73		10.69	0.00	0.00	1.04	14.46
Financial Sector	1.99	48.52		96.81	45.22	24.34	250.93
Nonfinancial corporations	0.00	0.00	43.59			22.51	66.11
Other resident sectors	0.16	0.00	145.17				145.33
Nonresidents	1.60	5.55	14.46	24.06			45.66
Total	6.48	55.11	248.97	120.87	45.22	56.38	

Notes: Cells indicate the liability of a column sector to a row sector as a percentage of GDP.

Source: Standardized report forms for monetary and financial data, Joint External Debt Hub, Coordinated Portfolio Investment Survey, and Quarterly External Debt Statistics.

## Indicators of Vulnerability

16. **Information contained in the balance sheet matrix can be used to assess mismatches in the size and structure of sectors’ financial assets and liabilities.** The

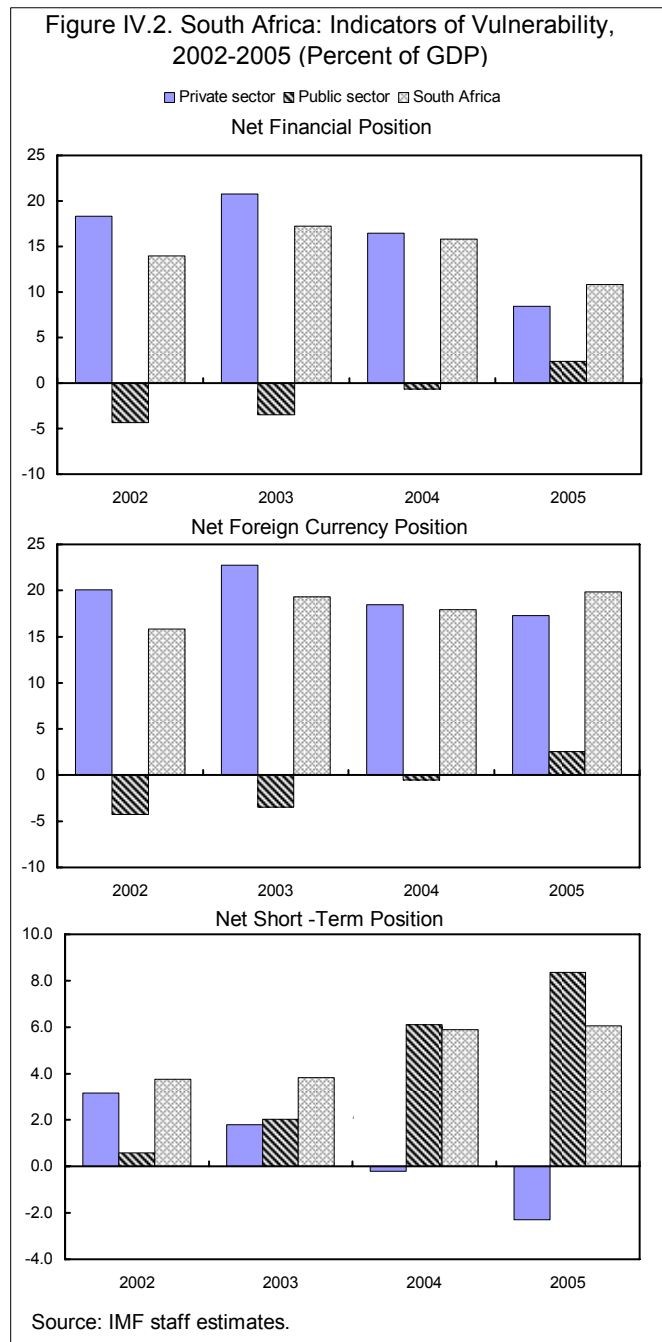
<sup>4</sup> The matrix allows us to use information from the financial sector to construct a large part of the financial component of the balance sheets of other sectors. It can be constructed for foreign or domestic currency-denominated liabilities and, less perfectly, for short- or medium- to long-term liabilities.

indicators used to gauge the vulnerabilities associated with different mismatches include the following (Lima et al, 2006):

- *Net financial position*: total financial assets minus total financial liabilities. A large negative position can point to solvency problems, but in some cases it might simply be the counterpart of physical assets excluded from the analysis.
- *Net short-term position*: short-term assets minus short-term liabilities at original maturities. A large negative position implies vulnerability to rollover risk and interest rate increases; however, if debt has floating rates, interest rate risk is not tied to maturity.
- *Net foreign currency position*: foreign currency assets minus foreign currency liabilities. A large negative position indicates vulnerability to exchange rate depreciation.
- *Capital structure*: equity liabilities minus debt liabilities. A large negative implies excessive reliance on debt financing.

## Overview of Developments

17. **The balance sheet of the economy as a whole appears to be sound.** The economy's gross financial assets have been on an upward trend, reflecting financial deepening and the gradual integration of South Africa into international financial markets (Tables IV.1–2). Its overall net financial position—i.e., its position toward the ROW—was positive at end-2005 though trending downward as the current account widened (Figure IV.2). This development was the net effect of an improving public sector position and a declining private sector position, consistent with the



fact that the current account deficit does not reflect a public sector deficit. The net foreign currency (FX) position is positive—more than 17 percent of GDP—and has been rather stable. The net short term position of the economy is positive and has been improving. Once again, in this case the trend is a net result of a slight decline in the private sector's position and an improvement in the public sector's position. The net short-term FX position of the economy is also positive (see Appendix I, table A4).

### E. Sectoral Balance Sheets

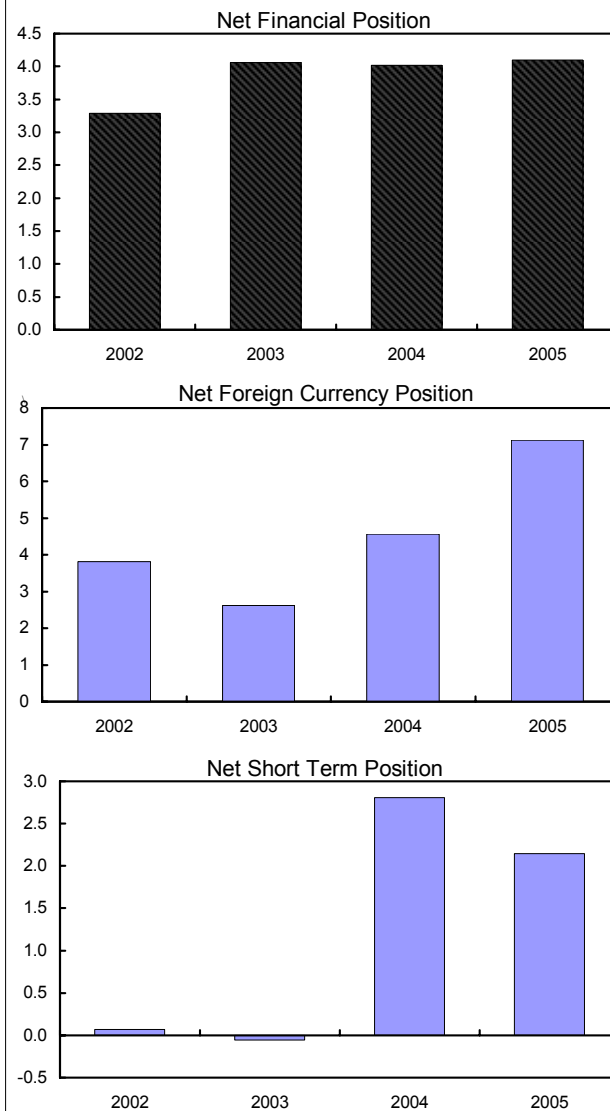
#### The Central Bank

18. **The balance sheet of the SARB seems sound and its vulnerabilities limited.** The net financial position has been gradually improving, from roughly 3.5 percent of GDP in 2002 to about 4.5 percent at the end of 2005 (Figure IV.3). The SARB has also managed to increase its net FX position from about 4 percent of GDP in 2002 to about 7 percent of GDP at the end of 2005.<sup>5</sup> Its liquidity position also improved between 2002 and 2005; the net short-term position increased from about zero in 2002 to over 2 percent of GDP at the end of 2005.

#### The Nonfinancial Public Sector

19. **The NFPS has strengthened its financial indicators in recent years, capitalizing its good fiscal performance.** As of end 2005, total liabilities exceeded total financial assets by about 40 percent of GDP compared with almost 50 percent of GDP at end-2002 (Figure IV.4). Short-term assets exceeded short-term liabilities by about 6 percent of GDP as of end-2005, compared with

Figure IV.3. South Africa Reserve Bank: Indicators of Vulnerability, 2002-2005 (Percent of GDP)



Source: IMF staff estimates.

<sup>5</sup> With its positive FX position, the SARB is vulnerable to an exchange rate appreciation, which is a rather normal condition for a central bank.

about half a percent of GDP in 2002. Most of the NFPS's liabilities are denominated in domestic currency, making it resilient to exchange rate shocks.

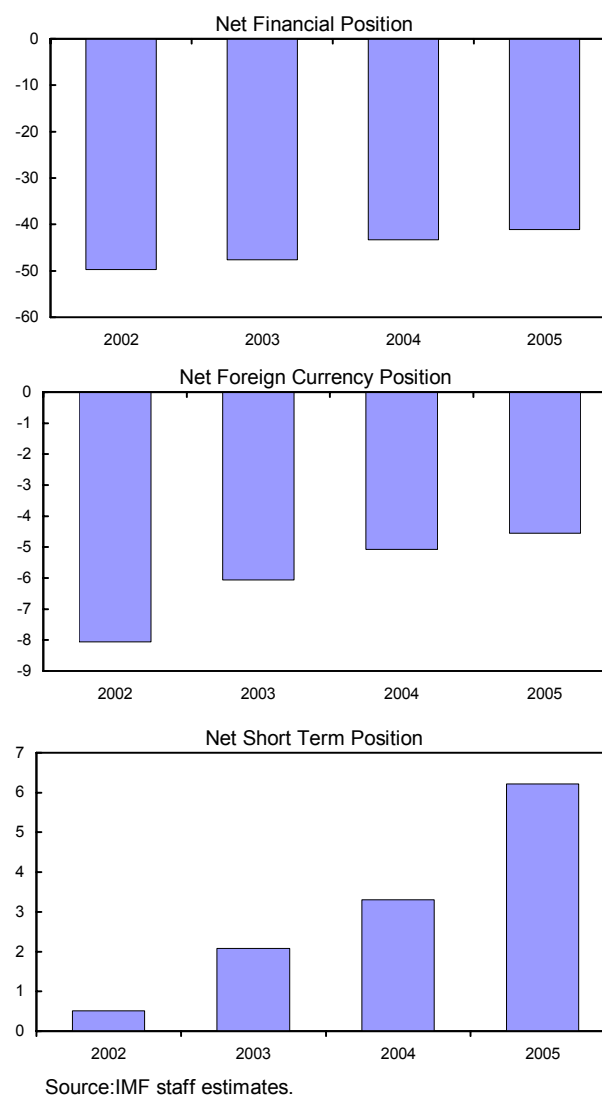
20. **The NFPS relies on the domestic bond market and has traditionally been able to borrow in domestic currency, in contrast with many EMC.** Domestic financial institutions held almost 88 percent of the NFPS's liabilities in 2005, up from around 76 percent in 2002.<sup>6</sup> At end-2005, with the NFPS's foreign-currency denominated liabilities and its negative net FX position at almost 5.6 and 5 percent of GDP, respectively, South Africa compares very well with most EMC. The positive net short-term position is consistent with the long-term nature of most public debt instruments.

21. **The negative net financial position of the NFPS does not seem to give rise to major vulnerabilities.** The negative net financial position does not raise insolvency concerns given the government's ability to generate primary surpluses. In particular, the debt sustainability analyses suggest that the downward trending public debt path seems robust to a variety of shocks, including exchange rate depreciation. Also, coupled with a positive short-term position, the negative financial position does not seem to make the public sector vulnerable to sudden shifts in investor sentiment. Moreover, NFPS debt is held by relatively stable investors, including the domestic nonbank financial institutions (such as pension funds and insurance companies).

## The Financial System

<sup>6</sup> Mostly "other financial institutions" (nonbanks). Only a small share of domestic debt instruments is held by the non financial corporate sector.

Figure IV.4. The Nonfinancial Public Sector: Indicators of Vulnerability, 2002-2005 (Percent of GDP)

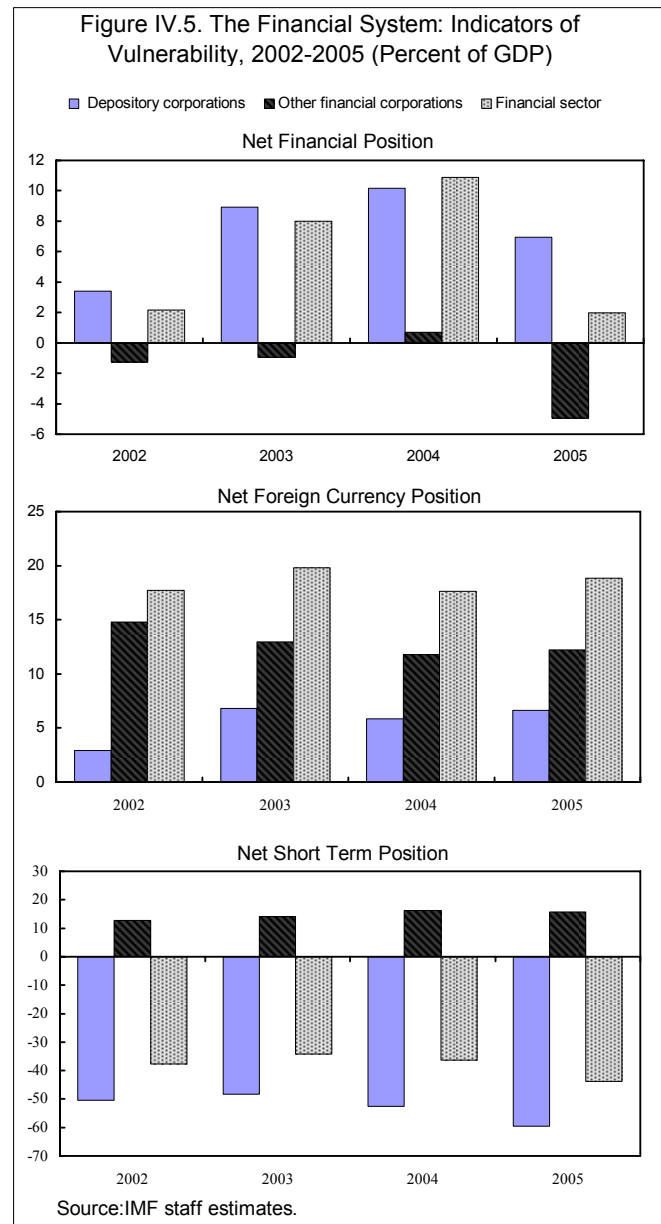


22. **Relative to most EMC, South Africa has a deeper financial system, which is comparable to those of industrialized countries.** Market capitalization of the JSE is the 17<sup>th</sup> largest in the world and is more than three times South Africa's GDP. Similarly, the bond market is well developed. The total value of listed bonds on the Bond Exchange of South Africa (BESA) amounts to over 45 percent of GDP. In 2006 foreign capital raised by companies listed on the JSE and through bonds issuance on the BESA amounted to almost 8.4 percent of GDP compared with only 2.4 percent of GDP a year earlier. The insurance sector has one of the highest penetrations in EMC; premiums equal almost 20 percent of GDP. The derivatives market too is well developed and securitization is growing rapidly.

23. **A comparison of financial sector balance sheets at end-2002 and end-2005 reveals that financial deepening has been associated with a greater exposure to "other domestic sectors."** Gross financial assets grew faster than GDP, increasing to about

250 percent of GDP from 215 percent of GDP in 2002 (Tables IV.1–2). Both components of the financial system (the banking system and other financial institutions) witnessed significant growth in financial assets. The growing assets of the banking system result almost exclusively from an increase in claims on "other domestic sectors," with households accounting for much of the increase.

24. **Reflecting its maturity transformation function, the financial system has a negative net short term position.** While nonbank financial institutions had a positive net short-term position at end-2005, the financial sector as a whole had a negative position of roughly 43 percent of GDP, driven by banking institutions. Naturally, this would expose



banks to a liquidity crisis in the unlikely extreme case of a deposit run. Banks hold sufficient liquid assets in relation to their short-term liabilities as required by the supervisory authority.

**25. The financial sector does not appear vulnerable to exchange rate depreciation.**

The financial system had a positive net FX position of about 20 percent of GDP as of the end of 2005 (Figure IV.5). Nonbank institutions account for almost two-thirds of this amount and banking institutions represent the remainder.<sup>7</sup> However, this does not mean that the banking sector is completely shielded from exchange rate depreciations. It could be affected indirectly should some of its debtors face liquidity problems associated with a depreciation.

**26. To sum up, the financial sector appears sound.** The sector has a positive net position, including a 10 percent of GDP positive position vis-à-vis the ROW. More disaggregated data reveals that “other financial corporations” have a negative net financial position but they enjoy a positive net position vis-à-vis the ROW, suggesting that they may be investing abroad on behalf of domestic clients as allowed by existing regulations. The financial sector’s exposure to the nonfinancial public sector is significant but not dominant, as it accounts for under 20 percent of the financial sector’s assets (Table IV.2). This reveals that the financial sector is largely oriented to support private sector activity. A potential vulnerability factor for the banking system is the exposure to households, whose share in the banking system’s assets has increase to 42 percent in 2005, from 32 percent in 2002. Consistent with this overall picture, the SARB’s Financial Stability Report indicates that the financial sector is resilient to shocks.

### **The Nonfinancial Corporate Sector**

**27. Consistent with the accelerating pace of gross fixed capital formation, the negative net financial position of the nonfinancial corporate sector has been increasing.**

The negative net financial position stood at almost 55 percent of GDP in 2005, up from almost 43 percent of GDP in 2002 (Figure IV.6). The bulk of these net liabilities are held by domestic residents; however, partly as a result of the rise in net portfolio inflows, the net position against the ROW became negative and stood at 1.5 percent of GDP in 2005, down from a positive position of nearly 2.5 percent in 2002. The negative position against the ROW is associated with an open FX position of 1.2 percent of GDP, largely short term.

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<sup>7</sup> Regulations limit banks’ net effective open position to 10 percent of qualifying capital and reserves.



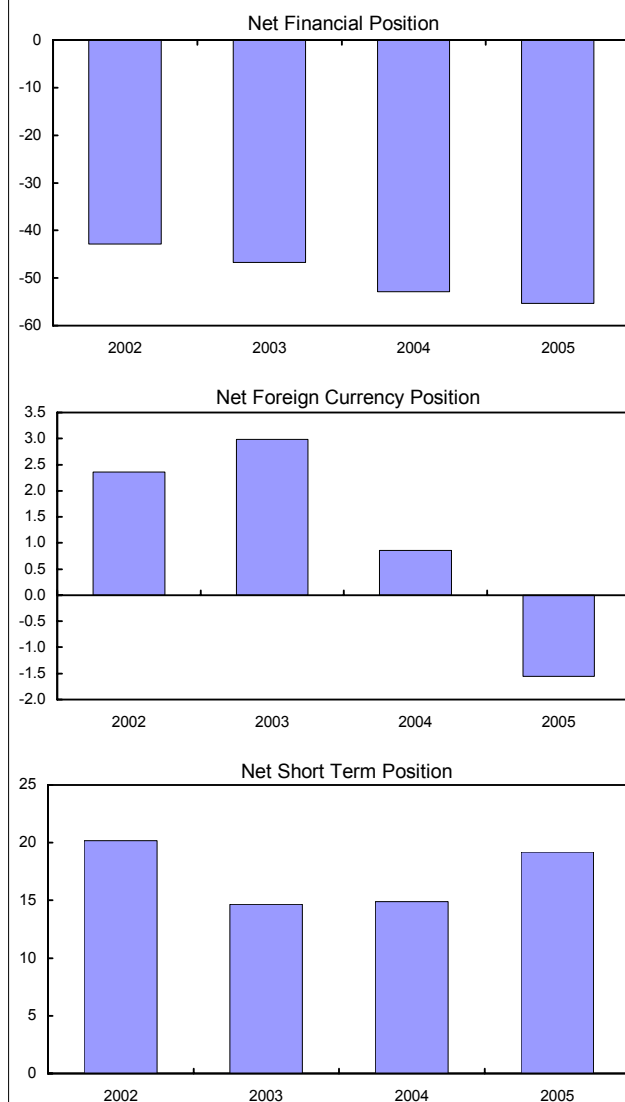
28. **Reflecting high profits in recent years, the balance sheet of the nonfinancial corporate sector shows an improvement in the capital structure.** Debt-to-equity ratios have gained ground; while in 2002 the debt-to-equity ratio was 1.15, by the end of 2005 it had fallen to 0.98. Consistent with this trend, the net short term position of the nonfinancial corporate structure appears solid, recovering in 2005 of a dip in 2003–04, possibly reflecting high profits in recent years (Figure IV.6).

29. **To sum up, the widening negative net financial position and the declining net FX position may pose some risks for the nonfinancial corporate sector.** While their net financial position has been declining, South African corporations seem to have improved their financing structure and mainly borrow long term. They remain, however, somewhat vulnerable to debt rollover and exchange rate risk.

#### The “Other Residents” Sector

30. **Vulnerabilities in the other residents sector seem to be limited despite an increase in liabilities.**<sup>8</sup> Total liabilities increased from 32.5 percent of GDP in 2002 to roughly 45 percent of GDP in 2005, as shown on Tables IV.1–2; but the net financial position of the sector remained about constant because of a corresponding increase in its financial assets (Figure IV.7). The sector managed to increase its liquidity; short-term assets exceeded short-term liabilities by 22 percent of GDP in 2005, up from about 21 percent of GDP in 2002. These indicators are the main counterparts of the negative short-term position of the financial sector; they include households’ and small companies’ holdings of bank deposits. Foreign currency mismatches in the sector are less than 1 percent of GDP.

Figure IV.6. The Nonfinancial Corporate Sector: Indicators of Vulnerability, 2002-2005 (Percent of GDP)



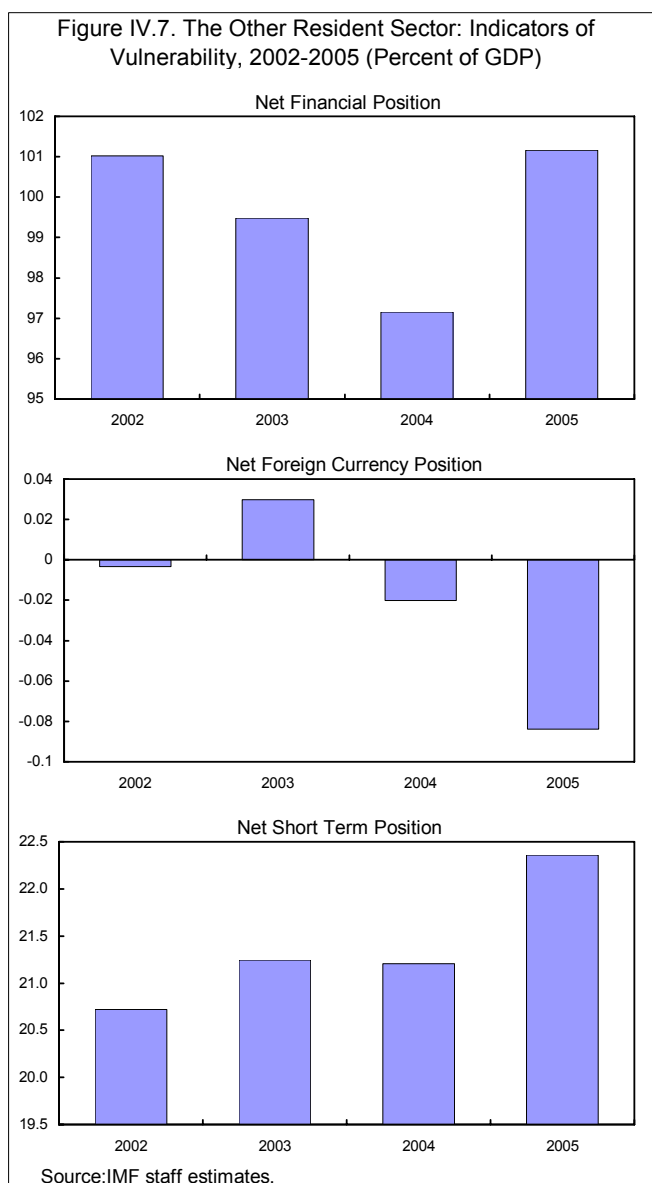
Source: IMF staff estimates.

<sup>8</sup> The other domestic resident sector includes small companies and households.

**31. A potential problem in the other resident sector is the increase in household indebtedness.<sup>9</sup>**

The ratio of household debt to disposable income increased from about 50 percent in 2002 to about 66 percent at the end-2005 and 76 percent by the first quarter of 2007. However, because of average real incomes increased and interest rates were relatively low, servicing the higher debt became more affordable. The ratio of debt service to disposable income fell from 7.2 percent in 2002 to 6.5 percent in 2005. Through 2006, it rose to 9 as interest rates increased and debt continued to rise. Adverse shocks to incomes or interest rates could cause problems that do not surface in the sector's aggregate indicators.

Households are vulnerable to interest rate hikes because an important share of household debt (mortgage) is at variable rates. The SARB suggests that debt servicing could remain contained despite a measured tightening of monetary policy (SARB, 2007) but the increase in household indebtedness has raised concerns. The implementation of the new Credit Act is expected to tighten lending standards, thereby containing risks of overborrowing.



## F. Sensitivity to Exchange Rate and Foreign Interest Rate Shocks

**32. Balance sheet analysis can help to ascertain whether an economy, or some of its sectors can withstand shocks to its liquidity emanating from large exchange rate depreciations or sharp increases in interest rates.** Changes in exchange rates and interest rates are among crisis indicators analyzed in many studies of currency or capital account crises. They affect sectoral liquidity, as well as net worth. A steep exchange rate depreciation is the most prominent crisis indicator, because financial crises almost always involve the

<sup>9</sup> See Chapter III of this Selected Issues Paper.

collapse of a currency (Hausmann and Velasco, 2004). Nonetheless, liquidity shortage or net worth (solvency) problems for the economy can emerge not only from a steep exchange rate depreciation but also from interest rate increases. The ultimate effects of those shocks may depend on mismatches between assets, liabilities, and income flows. In what follows the analysis takes into account mismatches between financial assets and liabilities.

33. **The analysis suggests that the economy can withstand large shocks, although some sectors may be vulnerable.** The question we are asking is how the solvency and liquidity of various sectors of the South African economy would be affected by significant adverse exchange rate and *foreign* interest rate shocks.

34. **Net financial positions appear resilient to a sizable depreciation.** The net financial and net FX positions computed for all the sectors at the end of 2005 (in Section E) are subject to a sensitivity analysis based on an assumption of nominal rand depreciation of 30 percent (Table IV.3). All sectors except the SARB and the financial sector lose from the depreciation because of their negative net FX positions; however, except for the public sector loss, which is close to 4 percent of the sector's assets, all losses are below 1 percent of both GDP and each sector's own assets. The net financial position of the country as a whole improves because its net FX position is positive.

Table IV.3. Net Foreign Currency Position Before and After Exchange Rate Shock

	Before the Shock	After the Shock		Loss/Gain	
	In millions of Rand	In Millions of Rand	In Millions of Rand	In percent of GDP	In percent of Own Assets
Central bank	108,432	121,444	13,012	0.85	8.02
NFPS	-70,072	-78,480	-8,409	-0.55	-3.78
Financial Sector	284,143	318,240	34,097	2.24	0.88
Corporate Sector	-19,129	-21,424	-2,295	-0.15	-0.23
Other resident sectors	-1,278	-1,431	-153	-0.01	-0.01
<b>Total</b>	<b>302,096</b>	<b>338,348</b>	<b>36,252</b>	<b>2.38</b>	<b>4.89</b>

Source: Balance sheet data and staff estimates.

35. **An assessment of the sensitivity of various liquidity measures reveals that the economy would weather exchange rate and foreign interest rate shocks without major problems** (Table IV.4). For these tests we consider five measures of liquidity for each sector: the net short term position and the net short-term FX position on an *original* maturity basis; these same two positions but on an *estimated residual* maturity basis, which is derived by

assuming that one quarter of medium and long term liabilities fall due within one year;<sup>10</sup> and the net FX position on a residual maturity basis less estimated interest payments, which are assumed equal to 10 percent of medium- and long-term FX liabilities. The analysis takes as a starting point the value of these liquidity indicators in December 2005, shown in column 1. Then, the same liquidity ratios are computed following a 30 percent depreciation of the rand (column 2), and an increase of 500 basis points in the foreign interest rate (column 4).<sup>11</sup> All amounts are in percent of GDP, and can be roughly considered liquidity “margins.”

**36. The NFPS and the nonfinancial corporate sector would be the most affected by the hypothesized shocks, but even in those cases the effects are moderate.** After the depreciation, the liquidity margin of the NFPS at the assumed residual maturity decreases by half a percent of GDP, while at original maturity the liquidity margin improves marginally. The liquidity margin of the nonfinancial corporate sector falls by less than one percent of GDP at both original and residual maturities. The economy as a whole gains about 8.8 to 10 percentage points of GDP, mostly as a result of the gains registered by the SARB and the financial sector. As a result of a 500 basis point hike in foreign interest rates, the NFPS, the financial sector, and the corporate sector see their liquidity margins fall by at most 0.3 percentage points of GDP.

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<sup>10</sup> This is a conventional stress test that treats all sectors symmetrically. See, for example, IMF Country Report 07/82, Republic of Croatia: Selected Issues, February 2007. For individual sectors, this treatment will be inexact, and thus the results of the exercise should not be taken literally. For example, for the NFPS, the assumption that ¼ of MLT debt falls due in one year is stringent, as the discussion of section E makes clear. In fact, only 8 percent of all marketable government bonds outstanding at end 2005 were scheduled to fall due in 2006.

<sup>11</sup> The analysis does not deal with the impact of interest rate changes on the value of assets and liabilities.

Table IV.4. South Africa: Liquidity Indicators Sensitivity Tests

	Hypothetical scenarios				
	2005 <sup>1</sup>	500 b.p. foreign interest increase			
		30 percent depreciation			
	(1)	(2)	(3) = (2) - (1)	(4)	(5) = (4) - (1)
(Percent of GDP)					
<b>Central bank</b>					
By original maturity					
Net short-term position	2.1	4.9	2.8	...	
Net short-term FX position	6.6	9.4	2.8	...	
By residual maturity					
Net short-term position less 1/4 of LT Liabilities	1.7	4.3	2.7	...	
FX only net short-term position less 1/4 of LT liabilities	6.2	8.9	2.7	...	
FX only net short-term position less 1/4 LT liabilities less interest	6.1	...	0.0	6.0	-0.1
<b>Nonfinancial public sector</b>					
By original maturity					
Net short-term position	6.1	6.2	0.1	...	
Net short-term FX position	0.2	0.3	0.1	...	
By residual maturity					
Net short-term position less 1/4 of LT Liabilities	-6.1	-6.7	-0.5	...	
FX only net short-term position less 1/4 of LT liabilities	-1.2	-1.7	-0.5	...	
FX only net short-term position less 1/4 LT liabilities less interest	-1.8	...	...	-2.1	-0.3
<b>Financial sector</b>					
By original maturity					
Net short-term position	-43.4	-35.8	7.6	...	
Net short-term FX position	17.7	25.2	7.6	...	
By residual maturity					
Net short-term position less 1/4 of LT Liabilities	-87.8	-80.4	7.4	...	
FX only net short-term position less 1/4 of LT liabilities	17.2	24.6	7.4	...	
FX only net short-term position less 1/4 LT liabilities less interest	17.0	...	...	16.9	-0.1
<b>Nonfinancial corporations</b>					
By original maturity					
Net short-term position	19.0	18.5	-0.5	...	
Net short-term FX position	-1.2	-1.7	-0.5	...	
By residual maturity					
Net short-term position less 1/4 of LT Liabilities	-10.0	-10.8	-0.8	...	
FX only net short-term position less 1/4 of LT liabilities	-1.8	-2.6	-0.8	...	
FX only net short-term position less 1/4 LT liabilities less interest	-2.0	...	...	-2.1	-0.1
<b>Other residents</b>					
By original maturity					
Net short-term position	22.1	22.2	0.0	...	
Net short-term FX position	0.1	0.1	0.0	...	
By residual maturity					
Net short-term position less 1/4 of LT Liabilities	10.8	10.9	0.0	...	
FX only net short-term position less 1/4 of LT liabilities	0.0	0.1	0.0	...	
FX only net short-term position less 1/4 LT liabilities less interest	0.0	...	...	0.0	0.0
<b>Total economy</b>					
By original maturity					
Net short-term position	6.0	16	10.0	...	
Net short-term FX position	23.3	33.3	10.0	...	
By residual maturity					
Net short-term position less 1/4 of LT Liabilities	-91.5	-83	8.8	...	
FX only net short-term position less 1/4 of LT liabilities	20.5	29.2	8.8	...	
FX only net short-term position less 1/4 LT liabilities less interest	19.3	...	...	18.8	-0.6

Source: Balance sheet data and authors' estimates.

<sup>1</sup> Balance sheet matrix figures.

## G. Summary and Conclusions

37. **The main finding of the analysis is that the balance sheet of the aggregate economy seems to be healthy and resilient to shocks.** This conclusion, based on our estimates of 2005 balance sheet matrices, would not be much altered if 2006 matrices could be constructed. Nevertheless, the rising current account deficit has led to a deterioration in the net financial position of the economy with respect to the ROW. The result also shows that the country has a positive net FX position and most of the liabilities of its residents are denominated in local currency, even if they are held by nonresidents. The positive net FX position suggests that the country has more than enough foreign currency assets to cover foreign currency liabilities. That said, the NFPS and nonfinancial corporate sector are moderately exposed to depreciation risk.

38. **The main vulnerabilities in the nonfinancial corporate sector are the negative net financial and net foreign currency positions.** Consistent with the rapid pace of fixed capital formation, the negative net financial position has widened. Net FX positions, though negative and widening in part as a result of foreign inflows, are moderate. South African corporations seem to have improved their financing structure and rely mainly on nondebt flows—although in recent months, corporations seem to have increased their borrowing from the banking system.<sup>12</sup> In addition, the high corporate profitability in recent times has ensured that corporations are flush with cash.

39. **Reflecting strong fiscal performance, the NFPS has improved its net financial, FX, and short-term positions.** The net financial and FX positions are negative, which might expose the sector to some risks. However, these risks are moderate, especially since the NFPS is a debtor mostly to domestic creditors and the largest share of public debt is denominated in domestic currency. The negative net financial position does not seem to be a major concern since the government runs primary surpluses, a factor reflected in strong ratings by credit agencies.

40. **The financial system does not present major vulnerabilities either.** Naturally, it shows a negative short position, but this is a consequence of its maturity transformation function. The declining net financial position with the ROW reflects large portfolio inflows into South Africa. Increasing credit exposure to the nonfinancial private sector, including households, bears watching, but financial health indicators are robust.

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<sup>12</sup> Our analysis of balance sheet matrices could not capture this development, since it is rather recent. See Chapter III of this Selected Issues paper.

## Appendix I

Table A1. South Africa: Intersectoral Net Financial Positions, December 2002 (Percent of GDP)

	Central bank	Non Financial Public Sector	Financial Sector	Nonfinancial corporations	Other residents	Nonresidents	Total
Central bank		-4.43	4.81	0.00	0.02	-3.69	-3.29
Non Financial Public Sector	4.43		37.21	0.00	0.00	8.05	49.70
Financial Sector	-4.81	-37.21		-45.19	101.01	-15.96	-2.16
Nonfinancial corporations	0.00	0.00	45.19		--	-2.36	42.82
Other resident sectors	-0.02	0.00	-101.01	--		--	-101.03
Nonresidents	3.69	-8.05	15.96	2.36	--		13.96
Total	3.29	-49.70	2.16	-42.82	101.03	-13.96	

Notes: Cells indicate net claims of the sector designated by the column on the sector designated by the row as a percentage of GDP. Source: Standardized report forms for monetary and financial data, Joint External Debt Hub, Coordinated Portfolio Investment Survey, and Quarterly External Debt Statistics.

Table A2. South Africa: Intersectoral Net Financial Positions, December 2005 (Percent of GDP)

	Central bank	Non Financial Public Sector	Financial Sector	Nonfinancial corporations	Other residents	Nonresidents	Total
Central bank		1.69	0.98	0.00	0.16	-6.88	-4.06
Non Financial Public Sector	-1.69		37.82	0.00	0.00	4.51	40.65
Financial Sector	-0.98	-37.82		-53.22	99.95	-9.89	-1.96
Nonfinancial corporations	0.00	0.00	53.22			1.54	54.76
Other resident sectors	-0.16	0.00	-99.95				-100.11
Nonresidents	6.88	-4.51	9.89	-1.54			10.71
Total	4.06	-40.65	1.96	-54.76	100.11	-10.71	

Notes: Cells indicate net claims of the sector designated by the column on the sector designated by the row as a percentage of GDP. Source: Standardized report forms for monetary and financial data, Joint External Debt Hub, Coordinated Portfolio Investment Survey, and Quarterly External Debt Statistics.

Table A3. South Africa--Intersectoral Asset and Liability Position Matrix, 2002  
(Millions of rands)

Gross and net positions Type of security	Central bank <sup>1</sup>			Nonfin. public sector <sup>1</sup>			Financial sector <sup>1</sup>			Nonfin. Corporations <sup>1</sup>			Other residents <sup>1</sup>			Nonresidents <sup>1</sup>		
	Claims	Liabilities	Net posit.	Claims	Liabilities	Net posit.	Claims	Liabilities	Net posit.	Claims	Liabilities	Net posit.	Claims	Liabilities	Net posit.	Claims	Liabilities	Net posit.
<b>Central bank</b>																		
Short-term	3,407	55,181	-51,774	70,459	14,254	56,205	24	34	-10	220	220	0	217	22,938	66,047	-43,109		
Domestic Currency	3,407	2,433	974	55,021	2,481	52,540	24	15	9	220	220	0	219	1,485	56,733	-55,248		
Foreign Currency	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,484	
Medium- and long-term	0	52,748	-52,748	15,437	11,773	3,665	0	18	-18	0	0	0	2	21,453	9,314	12,139		
Domestic Currency	0	52,748	-52,748	15,437	11,773	3,665	0	18	-18	0	0	0	2	21,453	9,314	12,139		
Foreign Currency	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	-70
<b>Nonfinancial public sector</b>																		
Short-term	55,181	3,407	51,774	513,529	78,603	434,926	0	0	0	0	0	0	0	104,357	10,243	94,114		
Domestic Currency	2,433	3,407	-1,675	56,962	62,055	-5,092	0	0	0	0	0	0	0	0	0	11	-11	
Foreign Currency	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Medium- and long-term	52,748	0	53,449	456,567	16,548	440,019	0	0	0	0	0	0	0	104,357	10,232	94,125		
Domestic Currency	52,748	0	53,449	453,245	16,548	436,697	0	0	0	0	0	0	0	104,357	10,232	94,125		
Foreign Currency	0	0	0	3,322	0	3,322	0	0	0	0	0	0	0	0	0	0	0	
<b>Financial sector</b>																		
Short-term	14,254	70,459	-56,205	78,603	513,529	-434,926	437,827	965,922	-528,095	1,560,824	380,318	1,180,506	90,814	277,319	-186,505			
Domestic Currency	2,481	55,021	-52,540	62,055	56,962	5,092	261,513	18,494	243,020	244,829	2,884	241,934	38,574	35,271	3,304			
Foreign Currency	0	0	0	0	0	0	13,143	6,930	6,213	244,438	2,884	241,544	21,663	-187,238	208,901			
Medium- and long-term	11,773	15,437	-3,665	16,548	456,567	-440,019	176,314	947,428	-771,114	1,315,996	377,424	938,572	52,240	242,048	-189,808			
Domestic Currency	11,773	15,437	-3,665	16,548	453,245	-436,697	176,314	947,428	-771,114	1,315,996	376,995	939,001	32,718	220,969	-188,250			
Foreign Currency	0	0	0	3,322	-3,322	0	0	0	0	0	429	-429	19,522	21,079	-1,558			
<b>Nonfinancial corporations</b>																		
Short-term	34	24	10	0	0	0	965,922	437,827	528,095	0	0	0	0	258,761	286,387	-27,626		
Domestic Currency	15	24	-9	0	0	0	18,494	261,513	-243,020	0	0	0	0	24,844	17,454	7,390		
Foreign Currency	0	0	0	0	0	0	11,564	248,371	-236,807	0	0	0	0	-209,073	-251,479	42,406		
Medium- and long-term	18	0	18	0	0	0	6,930	13,143	-6,213	0	0	0	0	233,917	268,933	-35,016		
Domestic Currency	18	0	18	0	0	0	947,428	176,314	771,114	0	0	0	0	233,917	268,933	-35,016		
Foreign Currency	0	0	0	0	0	0	947,428	176,314	771,114	0	0	0	0	209,073	251,479	-42,406		
<b>Other resident sectors</b>																		
Short-term	3	220	-217	0	0	0	380,318	1,560,824	-1,180,506	0	0	0	0	0	0	0	0	0
Domestic Currency	1	220	-219	0	0	0	2,894	244,829	-241,934	0	0	0	0	0	0	0	0	0
Foreign Currency	0	0	0	0	0	0	2,894	244,438	-241,544	0	0	0	0	0	0	0	0	0
Medium- and long-term	2	0	2	0	0	0	0	0	-390	0	0	0	0	0	0	0	0	0
Domestic Currency	2	0	2	0	0	0	377,424	1,315,996	-938,572	0	0	0	0	0	0	0	0	0
Foreign Currency	0	0	0	0	0	0	376,995	1,315,996	-939,001	0	0	0	0	0	0	0	0	0
<b>Nonresidents</b>																		
Short-term	66,047	22,938	43,109	10,243	104,357	-94,114	277,319	90,814	186,505	286,387	258,761	27,626	0	0	0	0	0	0
Domestic Currency	56,733	1,485	55,248	11	0	11	35,271	38,574	-3,304	17,454	24,844	-7,390	0	0	0	0	0	0
Foreign Currency	0	1,484	-1,484	0	0	0	-187,238	21,663	-208,901	-251,479	-209,073	-42,406	0	0	0	0	0	0
Medium- and long-term	9,314	21,453	-12,139	10,232	104,357	-94,125	222,508	16,911	205,597	268,933	233,917	35,016	0	0	0	0	0	0
Domestic Currency	70	0	70	0	0	0	222,048	52,240	189,808	268,933	233,917	35,016	0	0	0	0	0	0
Foreign Currency	9,244	21,453	-12,209	10,232	104,357	-94,125	220,969	32,718	188,250	251,479	209,073	42,406	0	0	0	0	0	0
<b>Total</b>																		
Short-term	97,048	95,903	38,470	92,253	673,067	-580,814	2,513,881	2,488,657	25,225	724,238	1,224,716	-500,478	1,561,044	380,321	1,180,723	476,870	639,996	-163,125
Domestic Currency	61,664	60,156	805	65,473	59,395	6,077	303,859	744,668	-440,810	278,991	43,353	235,638	245,049	2,895	242,153	64,904	109,469	-44,565
Foreign Currency	4,931	60,156	-55,927	64,526	59,395	5,130	74,420	713,288	-638,868	-3,085	-197,494	194,410	244,659	2,895	241,763	-185,926	-438,717	252,790
Medium- and long-term	56,733	2	56,732	947	0	947	229,439	31,380	198,058	282,076	240,847	41,229	390	0	390	250,830	548,186	-297,356
Domestic Currency	73,854	36,890	37,665	26,780	613,672	-586,891	2,210,023	1,743,989	466,034	445,247	1,181,363	-736,116	1,315,996	377,426	938,570	411,967	530,527	-118,560
Foreign Currency	64,610	15,437	49,874	16,548	505,992	-489,444	2,177,856	1,717,131	460,725	427,793	1,156,519	-728,726	1,315,996	376,997	938,999	241,791	472,517	-230,726
	9,244	21,453	-12,209	10,232	107,679	-97,447	32,167	26,858	5,309	17,454	24,844	-7,390	0	429	-429	170,176	58,009	112,166

Source: Standardized report forms for monetary and financial data, joint external debt hub, quarterly external debt statistics, coordinated portfolio investment survey, and authors' estimates.

<sup>1</sup>The claims column shows the claims of the column sector on the row sector, and so on.



Table A4. South Africa–Intersectoral Asset and Liability Position Matrix, 2005  
(Millions of rands)

Type of security	Central bank <sup>1</sup>			Nonfin. public sector <sup>1</sup>			Financial sector <sup>1</sup>			Nonfin. Corporations <sup>1</sup>			Other residents <sup>1</sup>			Nonresidents <sup>1</sup>		
	Claims	Liabilities	Net posit.	Claims	Liabilities	Net posit.	Claims	Liabilities	Net posit.	Claims	Liabilities	Net posit.	Claims	Liabilities	Net posit.	Claims	Liabilities	Net posit.
<b>Central bank</b>																		
Short-term	42,047	16,037	26,010	42,047	16,037	26,010	42,047	16,037	26,010	42,047	16,037	26,010	42,047	16,037	26,010	42,047	16,037	26,010
Domestic Currency	40,643	2,954	37,688	40,643	2,954	37,688	40,643	2,954	37,688	40,643	2,954	37,688	40,643	2,954	37,688	40,643	2,954	37,688
Foreign Currency	1,404	13,082	-11,679	1,404	13,082	-11,679	1,404	13,082	-11,679	1,404	13,082	-11,679	1,404	13,082	-11,679	1,404	13,082	-11,679
Medium and long-term	1,404	13,082	-11,679	1,404	13,082	-11,679	1,404	13,082	-11,679	1,404	13,082	-11,679	1,404	13,082	-11,679	1,404	13,082	-11,679
Domestic Currency	1,404	13,082	-11,679	1,404	13,082	-11,679	1,404	13,082	-11,679	1,404	13,082	-11,679	1,404	13,082	-11,679	1,404	13,082	-11,679
Foreign Currency	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Nonfinancial public sector</b>																		
Short-term	16,037	42,047	-26,010	16,037	42,047	-26,010	16,037	42,047	-26,010	16,037	42,047	-26,010	16,037	42,047	-26,010	16,037	42,047	-26,010
Domestic Currency	2,954	40,643	-39,303	2,954	40,643	-39,303	2,954	40,643	-39,303	2,954	40,643	-39,303	2,954	40,643	-39,303	2,954	40,643	-39,303
Foreign Currency	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Medium and long-term	13,082	1,404	13,294	13,082	1,404	13,294	13,082	1,404	13,294	13,082	1,404	13,294	13,082	1,404	13,294	13,082	1,404	13,294
Domestic Currency	13,082	1,404	13,294	13,082	1,404	13,294	13,082	1,404	13,294	13,082	1,404	13,294	13,082	1,404	13,294	13,082	1,404	13,294
Foreign Currency	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Financial sector</b>																		
Short-term	15,583	30,674	-15,092	164,590	746,798	-582,208	164,590	746,798	-582,208	164,590	746,798	-582,208	164,590	746,798	-582,208	164,590	746,798	-582,208
Domestic Currency	1,175	25,348	-24,173	142,750	88,447	54,303	142,750	88,447	54,303	142,750	88,447	54,303	142,750	88,447	54,303	142,750	88,447	54,303
Foreign Currency	1,175	25,348	-24,173	142,750	88,447	54,303	142,750	88,447	54,303	142,750	88,447	54,303	142,750	88,447	54,303	142,750	88,447	54,303
Medium and long-term	14,408	5,327	9,082	21,840	658,352	-636,512	21,840	658,352	-636,512	21,840	658,352	-636,512	21,840	658,352	-636,512	21,840	658,352	-636,512
Domestic Currency	14,408	5,327	9,082	21,840	658,352	-636,512	21,840	658,352	-636,512	21,840	658,352	-636,512	21,840	658,352	-636,512	21,840	658,352	-636,512
Foreign Currency	0	0	0	0	648	-648	0	648	-648	0	648	-648	0	648	-648	0	648	-648
<b>Nonfinancial corporations</b>																		
Short-term	25	19	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic Currency	5	19	-13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Foreign Currency	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Medium and long-term	20	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic Currency	20	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Foreign Currency	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Other resident sectors</b>																		
Short-term	2	2,427	-2,424	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic Currency	2	2,427	-2,425	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Foreign Currency	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Medium and long-term	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Domestic Currency	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Foreign Currency	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Nonresidents</b>																		
Short-term	130,587	24,642	105,946	15,948	85,421	-69,474	374,889	222,528	152,361	374,889	222,528	152,361	374,889	222,528	152,361	374,889	222,528	152,361
Domestic Currency	101,142	2,561	98,580	2,654	0	2,654	37,196	52,303	-15,107	37,196	52,303	-15,107	37,196	52,303	-15,107	37,196	52,303	-15,107
Foreign Currency	101,142	1,011,141	2,654	1,011,141	2,654	0	2,654	300,437	14,088	286,349	310,613	342,080	310,613	342,080	310,613	342,080	310,613	342,080
Medium and long-term	29,445	22,080	7,365	13,293	85,421	-72,128	337,494	170,226	167,268	337,494	170,226	167,268	337,494	170,226	167,268	337,494	170,226	167,268
Domestic Currency	75	0	75	0	0	0	320,133	153,376	166,756	320,133	153,376	166,756	320,133	153,376	166,756	320,133	153,376	166,756
Foreign Currency	29,371	22,080	7,291	13,293	85,421	-72,128	17,361	16,850	511	35,948	28,204	7,744	0	0	0	28,204	35,948	-7,744
<b>Total</b>																		
Short-term	99,808	99,808	62,426	222,584	848,256	-625,672	3,862,415	3,832,290	30,126	1,017,616	1,860,503	-842,887	2,236,941	696,024	1,540,917	702,875	867,785	-164,910
Domestic Currency	105,278	70,997	32,666	186,047	91,401	94,646	429,587	1,097,675	-668,087	365,353	72,888	292,465	341,678	1,110	340,568	83,068	176,940	-93,872
Foreign Currency	4,136	70,996	-68,476	183,343	91,401	91,942	129,150	1,069,156	-940,006	41,660	-269,192	310,852	340,377	1,110	339,267	-273,101	-537,907	264,806
Medium and long-term	101,142	1,011,141	2,654	2,704	0	2,704	300,437	28,519	271,919	323,693	342,080	-18,387	1,301	0	1,301	356,169	714,847	-358,678
Domestic Currency	56,956	28,811	29,761	36,537	756,855	-720,318	3,432,828	2,734,615	698,213	652,263	1,787,615	-1,135,352	1,895,263	694,914	1,200,349	619,807	690,845	-71,038
Foreign Currency	27,586	6,731	22,470	23,244	670,786	-647,543	3,392,884	2,706,995	685,989	616,316	1,750,925	-1,134,609	1,895,263	692,336	1,202,928	467,253	594,873	-127,620
Nonfinancial public sector	29,371	22,080	7,291	13,293	86,069	-72,776	39,944	27,720	12,224	35,948	36,690	-742	0	2,579	-2,579	152,555	95,973	56,582

Source: Standardized report forms for monetary and financial data, joint external debt hub, quarterly external debt statistics, coordinated portfolio investment survey, and authors' estimates.

<sup>1</sup> The claims column shows the claims of the column sector on the row sector, and so on.

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## SOUTH AFRICA: TAX SUMMARY AS OF JUNE 2007<sup>1</sup>

(All amounts in South African rand)

Tax	Nature of Tax	Exemptions and Deductions	Rates																		
<b>1. Taxes on income, profits, and capital gains</b>																					
<b>1.1. Individual income tax</b>																					
Income Tax Act No. 58 of 1962, as amended	<p>A central government tax is charged on taxable income, assessed as gross income less exemptions and deductions, received by South African residents on their worldwide income, with relief for the avoidance of double taxation.</p> <p>Nonresidents working in South Africa for short periods are liable for tax in South Africa, in respect of their South African source income, with relief for the avoidance of double taxation.</p> <p>As of end-April 2007, comprehensive agreements for avoidance of double taxation on the same income were in force with (or applied to) 61 countries, with agreements under (re)negotiation or in the process of signing or ratification with 20 other countries.</p> <p>Cash allowances and noncash fringe benefits are subject to taxation according to formulas, including employer-owned vehicles, interest free or low interest loans, and residential accommodation.</p> <p>Wage and salary earners are subject to withholding at the source (pay-as-you-earn, PAYE). Income tax returns must be</p>	<p><i>Exemptions</i> are the first R 18,000 of taxable interest and dividends for taxpayers under 65 years of age and R 26,000 of taxable interest for taxpayers age 65 and over. Dividends from resident companies received by residents and nonresidents are generally exempt from tax. Foreign interest and foreign dividends are generally taxable, but exempt up to R 3,000 out of the total taxable interest and dividend exemption. Interest is exempt where earned by nonresidents who are absent from South Africa for 183 days or more per annum and who are not carrying on business through a permanent establishment in South Africa.</p> <p>Other exemptions include: (i) benefits payable under the Unemployment Insurance Act, and (ii) leave gratuities on retirement/retrenchment up to R 30,000.</p> <p><i>Deductions</i> are allowed for</p> <p>(i) Annual contributions to pension and retirement funds (the greater of R 1,750 or 7½ percent of remuneration from retirement funding employment);</p> <p>(ii) Arrear pension fund contributions (up to a maximum of R 1,800 per annum; any excess over R 1,800 may be carried forward to the following year of assessment);</p> <p>A separate rate of 40 percent applies to trusts,</p>	<p>For the year of assessment ending February 29, 2008, the following applies:</p> <p>Tax thresholds:</p> <p>Below age 65: R 43,000</p> <p>Age 65 and over: R 69,000</p> <p>Rebates (deductible from normal tax determined on taxable income):</p> <p>Primary rebate: R 7,740</p> <p>Additional rebate: R 4,680 (persons 65 years and older).</p> <p>Tax is calculated on the taxable income of any person under 65 years of age in accordance with the table below:</p> <table><tr><th>Taxable Annual Income</th><th>Marginal Tax Rates</th></tr><tr><th>(In Rand)</th><th>(In percent)</th></tr><tr><td>0 to 43,000</td><td>0</td></tr><tr><td>43,001 to 112,500</td><td>18</td></tr><tr><td>112,501 to 180,000</td><td>25</td></tr><tr><td>180,001 to 250,000</td><td>30</td></tr><tr><td>250,001 to 350,000</td><td>35</td></tr><tr><td>350,001 to 450,000</td><td>38</td></tr><tr><td>450,001 +</td><td>40</td></tr></table>	Taxable Annual Income	Marginal Tax Rates	(In Rand)	(In percent)	0 to 43,000	0	43,001 to 112,500	18	112,501 to 180,000	25	180,001 to 250,000	30	250,001 to 350,000	35	350,001 to 450,000	38	450,001 +	40
Taxable Annual Income	Marginal Tax Rates																				
(In Rand)	(In percent)																				
0 to 43,000	0																				
43,001 to 112,500	18																				
112,501 to 180,000	25																				
180,001 to 250,000	30																				
250,001 to 350,000	35																				
350,001 to 450,000	38																				
450,001 +	40																				

<sup>1</sup> Updated by N. Gueorguiev, African Department, June 2007. For further information, see <http://www.sars.gov.za> or <http://www.treasury.gov.za>.

Tax	Nature of Tax	Exemptions and Deductions	Rates
	submitted at the end of the tax year for salaried persons whose net remuneration is in excess of R 60,000. Directors of private companies are subject to PAYE, according to a formula for withholding.	(iii) Retirement annuity fund contributions (up to the greater of 15 percent of nonretirement funding income or R 3,500 less current deductions to a pension fund, or R 1,750. Deductions for arrear retirement annuity contributions are permitted as in (ii)),	other than special trusts. A special trust is a trust created solely for the benefit of a person who suffers from any mental illness or a serious physical disability. Special trusts are taxed at the tax rates applicable to individuals under 65 years of age.
	Standard Income Tax on Employees (SITE) falls under the PAYE system; SITE is applicable to net remuneration up to R 60,000 for taxpayers who do not receive travel allowances or any other income. SITE taxpayers are not required to submit income tax returns.	(iv) Medical expenses: monthly caps for tax-free medical scheme contributions; deduction of medical expenses allowed to the extent they exceed 7.5 percent of income. Deductions are unlimited for taxpayers over 65 years of age or handicapped.	
	In the case of other individuals, provisional payments are required in two half yearly instalments. Provisional taxpayers with a taxable income exceeding R 50,000 may make a third voluntary payment. Individuals below the age of 65 who do not conduct business and earn taxable interest, dividends, and rental income of less than R 10,000 a year are not required to register for provisional tax purposes. Individuals age 65 and older are not required to register for provisional tax purposes, if their annual taxable income consists exclusively of remuneration, interest, dividends or rent from the lease of fixed property and is R 80,000 or less.	(v) Donations to approved nonprofit organizations (up to 10 percent of taxable income before deducting medical expenses).	
		Allowances are made in respect of subsistence and traveling allowances and advances.	
	Pensions from South African sources are subject to income tax, with the exception of pensions of war veterans and certain disability payments. Pension fund administrators are required to withhold tax at the source (PAYE). Annuities, rental income, and royalties are taxable.		

Tax	Nature of Tax	Exemptions and Deductions	Rates
	The tax year runs from the first day of March to the last day of February.		
1.2. <i>Capital gains tax</i>	Capital gains on the disposal of assets are subject to income tax (Schedule 8 of the Income Tax Act). Events that trigger a disposal of assets include a sale, donation, exchange, loss, death, and emigration.	Exclusions include: a gain of up to R 1.5 million from the sale of a primary residence; most personal use assets, such as motor vehicles, furniture and collectibles; proceeds from an original endowment policy or original life insurance policy; compensation for personal injury or illness; and prize winnings from a South African competition (e.g., the national lottery).	For the taxation of capital gains of individuals and special trusts, 25 percent of the net capital gain is included when calculating the tax payable (after deducting the annual exclusion). For companies, close corporations and trusts, 50 percent of the net capital gain is included. The taxable gain is included in taxable income.
Income Tax Act No. 58 of 1962, as amended	Nonresidents are subject to capital gains tax on South African real estate and shares in companies holding South African real estate.		With these provisions, the maximum <i>effective</i> rate of the tax is: Individuals 10 percent (i.e., 40 percent maximum income tax rate, applied to 25 percent of net capital gains) Companies 15 percent Trusts 20 percent
1.3. <i>Corporate income tax</i>	A central government tax levied on the worldwide taxable income derived by South African resident companies, with appropriate relief to avoid double taxation. Taxable income is defined as gross income, other than capital receipts and exempt income, less allowable deductions and set off of losses.	Deductions include normal operating costs, Government's cash grants, interest, and depreciation allowances but exclude dividends and capital expenditure.  Small business corporations are taxed at a rate of zero percent on the first R 43,000 of taxable income.	a. <i>Non-gold mining companies</i> : 29 percent of taxable income. Nonresident companies earning South African source income are taxed at a rate of 34 percent. These companies are not subject to the Secondary Tax on Companies (see 1.4) in respect of dividends.  b. <i>Employment companies</i> : 34 percent
Income Tax Act No. 58 of 1962, as amended	The tax year of assessment is the financial accounting year. Companies are required to make two provisional tax payments in respect of each year of assessment. The first payment is made within six months after the commencement of the year of assessment, the second at the end of such year, and companies with taxable income in excess of R 20,000 have the option of making a third payment within a period of	Depreciation allowances of non-mining companies vary according to type of asset, life expectancy, and intensity of use of assets. Generally, the straight-line method is used. Plant and machinery used in a process of manufacture, including aircraft and ships used by a taxpayer in the carrying on of his trade, may be written off on a straight line basis over five years. Farming machinery may be written off at 50 percent, 30 percent, and 20 percent	c. <i>Qualifying small business corporations (turnover below R 14 million)</i> : 0 percent of taxable income up to R 43,000; 10 percent of taxable income between 43,001 and R 300,000 and 29% of taxable income in excess of R300,000.  d. <i>Gold mining companies</i> : Formula-based tax rate determined in accordance with one of the following:

Tax	Nature of Tax	Exemptions and Deductions	Rates
	six months from the end of the tax year (seven months for companies with a February year end).	over three years. An accelerated allowance for new machinery and manufacturing assets acquired after March 1, 2002 is provided for, on a 50:30:20 basis.	(a) Where the company is not exempt from the secondary tax on companies (STC):  $y = 35 - (175 \div x)$ or  (b) where the company is exempt from the STC:  $y = 45 - (225 \div x)$
	As of end-April 2007, comprehensive agreements for avoidance of double taxation on the same income were in force with 61 countries, with agreements under negotiation or in the process of signing or ratification with 20 other countries.	Accelerated depreciation allowances are available for oil and gas drilling.  Deduction for current R&D expenditure is 150 percent.	In the formula $y$ is the tax rate and $x$ is the profit-to-revenue ratio.
	Limited agreements for the avoidance of double taxation on profits derived from sea or air transport are also in force with two countries.	Qualifying small companies are eligible for immediate write-off of all manufacturing plant and machinery in the year in which it is brought into use.	e. <i>Oil extraction companies</i> : taxed at normal rate.
	Gold mining companies are subject to special tax provisions.	Small items up to R 5,000 qualify for an immediate 100 percent depreciation.  Depreciation allowances are allowed for certain permanent structures: industrial buildings and hotels – 5 percent a year; airport service facilities — 5 percent a year; electricity transmission lines, telephone transmission lines and railway lines – 5 percent a year; pipelines for transporting oil and gas – 10 percent a year.  Taxpayers investing in designated depressed urban areas receive special accelerated depreciation allowances for construction (20 percent in the first year, 5 percent per year for the subsequent 16 years) or refurbishment of buildings (20 percent straight line over five years).	f. <i>Long-term insurance companies</i> : 29 percent tax is levied on taxable income derived by the funds representing the interests of shareholders, individual policyholders, and company policyholders.  g. <u>Income derived by retirement funds</u> : From March 1, 2007 this income is fully exempt.
		Capital expenditure is allowable as a deduction from income of all types of mines in the year of assessment during which it is	



Tax	Nature of Tax	Exemptions and Deductions	Rates
		incurred (immediate expensing), limited, however, to the taxable income from mining before the allowance. Any unutilized capital expenditure may be carried forward to the next year as unredeemed capital expenditure. Cost of land, mineral rights, mining rights, and servitudes are not deductible.	
		An assessed loss can be carried forward indefinitely but cannot be carried back.	
		Learnership allowances as tax deductions to promote on-the-job-training: Allowances are granted on commencement and completion of the learnership. The amount of the allowance depends on whether the learnership agreement is with an existing employee, new employee, or a disabled person.	
1.4. <i>Secondary tax on companies (STC)</i>	A tax on companies declaring dividends. The tax is payable on net dividends, i.e. dividends declared less dividends received since the immediately preceding dividend declaration.	<i>Exemptions</i> include:	12½ percent; 10 percent from October 1, 2007.
Income Tax Act No. 58 of 1962, as amended	To be converted into a dividend tax from October 1, 2007; applicable to all distributions to shareholders excluding the return of capital in a capital reduction, deregistration, or liquidation.	1. Dividend payments of fixed property companies as defined in section 47 of the Collective Investment Schemes Control Act. These dividends are taxed in the hands of the recipient.  2. Dividends in specie in relation to approved unbundling transactions.  3. Dividends declared by companies to shareholders, which form part of the same group of companies (a shareholding test of at least 70 percent is applied).	
2. Social security contributions			

Tax	Nature of Tax	Exemptions and Deductions	Rates
2.1. <i>Unemployment insurance contributions</i>	A contribution collected for the Unemployment Insurance Fund, administered by the South African Revenue Service.	The maximum earnings amount subject to the tax is R 139,944 per year.	Employee and employer contributions of 1 percent each of the employee's monthly remuneration, payable monthly by employers.
Unemployment Insurance Contribution Act No. 4 of 2002.			
2.2. <i>Work injury insurance contributions</i>	A compulsory insurance scheme.	The maximum earnings amount subject to the tax is R 179,088 per year.	Insurance premiums vary with risk, according to 23 different classes of employers (i.e., sectors). <sup>2</sup>
2.3 <i>Skills Development Levy</i>	A compulsory charge on total remuneration paid by employers, earmarked to fund skills development. The levy is payable for PAYE-registered employers with an annual payroll in excess of R 500,000.	Exclusions include: amounts paid to independent contractors; reimbursed amounts; amounts paid for services rendered by directors of private companies.	1 percent of payroll.
Skills Development Levy Act No. 9 of 1999, as amended		Partial rebates are available for training provided by employers from Sector Training and Education Authorities, which administer the skills development funds.	
		The levy is a deductible expense for income tax purposes.	
<b>3. Taxes on property</b>			
3.1. <i>Property tax</i> Municipal Property Rates Act No. 6 of 2004.	A municipal tax payable on the capital value of land and improvements to finance the cost of municipal services. The tax may be levied on residential, industrial, commercial, farm, state, and public service property and land owned by public benefit organizations.  New property rate system based on	The rate is levied on the basis of market valuation in rand. Property valuation may be valid for a maximum of five financial years. The valuation of public infrastructure is discounted by 30 percent. Municipalities may exempt or provide reduced valuation to other specific categories of owners by use, location, or ownership, but not to specific property owners.	Rates are set by municipal councils and differ across local governments.  Annual increases in property rates may be capped by the national Minister of Provincial and Local Government, in consultation with the national Minister of Finance.

<sup>2</sup> The average rate for 2002/03 was R 1.40 per R 100 of earnings.

Tax	Nature of Tax	Exemptions and Deductions	Rates
	market values to be phased in over 3 years. Old system currently still in place.	Specific exemptions include: a. Mining rights. b. Property belonging to a land reform beneficiary (for 10 years after registry of deed). c. The first R 15,000 of the market value of a residential property. d. Property registered and used as a place of public worship. e. National parks.	
3.2. <i>Estate duty</i>	A central government tax payable on the estate of an individual. Property includes life insurance proceeds and lump-sum benefits received from pension or provident fund benefits.  The estate of a deceased nonresident consists of only his or her South African assets. Agreements to avoid double estate taxes are in place with the U.K., the U.S., Botswana, Lesotho, Swaziland, and Zimbabwe.	Deductions include funeral and estate administration expenses; debts of deceased as at the date of death; donations to public benefit organizations; and property accruing to the surviving spouse. In addition, a deduction of R 3,5 million is applicable.	20 percent.
3.3. <i>Donations tax</i>	A central government tax payable by the resident donor on the cumulative value of property donated.	Donations to spouses and to public benefit organizations are exempt. Annual exemption limit of R 100,000 apply for natural persons.	20 percent of the value of the property donated.
Income Tax Act No. 58 of 1962, as amended			
3.4. <i>Transfer duty</i>	A tax payable on the purchase consideration or fair value (whichever is the greater) of transfers of real estate.	Exemption on the first R 500,000.	For natural persons, 5 percent on the value in excess of R 500,000 but under R 1 million plus 8 percent on the amount in excess of R 1 million.  For legal entities, 8 percent of total value of property.
Transfer Duty Act No. 40 of 1949, as amended			

Tax	Nature of Tax	Exemptions and Deductions	Rates
<b>4. Domestic taxes on goods and services</b>			
4.1. <i>Value-added tax (VAT)</i>	A central government tax levied on the supply of goods and services. VAT is collected at a single, positive rate, is <i>consumption-type</i> and allows full and immediate tax credit on capital and intermediate goods. VAT is based on a <i>destination principle</i> with exports zero-rated and imports taxed). An <i>invoice-based credit method</i> is used, with VAT calculated on sales and tax paid on the difference between VAT on sales and VAT on purchases, adequately supported by invoices.	Main <i>zero-ratings</i> include (i) exports; (ii) several food items including brown bread, cooking oil, maize meal, milk, eggs, fruit, and vegetables; (iii) illuminating paraffin; (iv) petrol and diesel; (v) several agricultural inputs including seeds, feed, and fertilizers sold to VAT registered farmers; (vi) inter-national transport services; (vii) municipal property rates; and (viii) grants by national and provincial governments to municipalities.	0 percent, 14 percent.
Value-Added Tax Act No. 89 of 1991, as amended		Main <i>exemptions</i> include: (i) financial services (mainly interest); (ii) residential rents; (iii) passenger transport by road or rail; (iv) educational services; (v) medical schemes and pension and life insurance benefits; (vi) medical services and medicines supplied by the state; and (vii) child care services. Threshold for small farmers and small four-monthly filers: R 1.2 million.	
4.2. <i>Gambling taxes</i>	A provincial government tax levied on gambling, casinos and betting.		The schedule of fees and levies differ across provinces.
			<ul style="list-style-type: none"> <li>- Casino license fees range from a flat rate of R 50,000 to R 114,000 for the basic license renewal. Additional amounts of about R 1,000 are charged per table, machine or employee. Levies on casino gambling revenue range from 5-12 percent and are levied on gross revenue.</li> <li>- Gambling machine operators tend to have lower flat-rate licenses but higher charges per machine and higher levies on income, ranging from 10-20 percent.</li> <li>- Bingo halls are charged per seat, and in some cases per employee. The revenue levies range from 2.5-15 percent of income,</li> </ul>

Tax	Nature of Tax	Exemptions and Deductions	Rates net of amounts paid out to punters.
4.3. <i>Excise duties</i> Customs and Excise Act No. 91 of 1964, as amended	Central government taxes payable by the manufacturer or importer of certain commodities. Most are specific, though some ad valorem rates exist.	A rebate is granted on excisable goods that are exported or used by diplomatic representatives and on taxable goods used by producers in farming, forestry and the manufacture of taxable goods for industrial or commercial purposes.	<p><i>Alcoholic beverages:</i></p> <p>Beer (excluding sorghum beer): 3,961 cents per liter absolute alcohol.</p> <p>Sorghum beer: 7.82 cents per liter.</p> <p>Sorghum powder: 34.7 cents per kilogram.</p> <p>Unfortified wine: 171.53 cents per liter.</p> <p>Fortified wine: 316.67 cents per liter.</p> <p>Sparkling wine: 512.14 cents per liter.</p> <p>Spirits: 6100.71 cents per liter absolute alcohol.</p> <p>Other fermented drinks: 198.05 to 401.88 cents per liter depending on the type.</p> <p><i>Tobacco products:</i></p> <p>Cigarettes: 615.64 cents per 20 cigarettes.</p> <p>Cigarette tobacco: 824.18 cents per 50 g.</p> <p>Pipe tobacco: 218.47 cents per 25g.</p> <p>Cigars: 3,773 cents per 23 g.</p> <p><i>Fuels:</i></p> <p>Petrol: 3,909 cents per liter.</p> <p>Diesel: 3,817 cents per liter.</p> <p><i>5 percent ad valorem excise duty:</i></p> <p>-- Beauty or make-up preparations and preparations for skin care;</p> <p>-- Motorcycles (200-800 cc engines).</p> <p><i>7 percent ad valorem excise duty:</i></p> <p>-- Perfumes and toilet waters;</p> <p>-- Fireworks;</p> <p>-- Articles of fur skin;</p> <p>-- Air conditioning machines;</p> <p>-- Line, telephone sets, and cellular phones;</p>

Tax	Nature of Tax	Exemptions and Deductions	Rates
			-- Loudspeakers and amplifiers; -- Sound and video recording or reproducing apparatus; -- Digital cameras and video cameras; -- Radio broadcast receivers; -- Monitors, projectors, and television reception apparatus; -- Water scooters; -- Firearms; -- Videogames and golf balls.
4.4. <i>Fuel levy</i>	A central government levy on the sale of petrol, diesel, and kerosene mixtures.	A concession is made for diesel fuel sales to primary producers (agriculture, forestry and mining) of 40 percent (40 cents per liter) of the general fuel levy on 80 percent of diesel consumed.	Petrol: R 1.21 per liter <sup>3</sup> Diesel: R 1.05 per liter Distillate fuels and mixture of kerosene: R 1.05 per liter Biodiesel: 63c per liter
Customs and Excise Act No. 91 of 1964, as amended		Fishing, coastal shipping, and offshore mining qualify for a 100 percent concession of the general fuel levy and Road Accident Fund (RAF) levy. Off-road freight transport (nonpassenger) qualifies for a full refund of RAF levy. Primary producers (agriculture, forestry and mining) also qualify for a full rebate of the RAF levy.  Diesel power plants with a capacity of more than 200 MW benefit from a full rebate of the general fuel levy and the RAF levy.	<i>Road Accident Fund levy:</i> An additional fuel levy of 41.5 cents per liter is collected on petrol and diesel for the Road Accident Fund.

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<sup>3</sup> Fuel excise rates are from April 4, 2007.

Tax	Nature of Tax	Exemptions and Deductions	Rates
4.5. <i>Motor vehicle taxes</i> Customs and Excise Act No. 91 of 1964, as amended	<p>A tax levied on the value of imported components used in the manufacture of duty payable motor cars, station wagons and similar dual purpose motor vehicles, excluding heavy duty motor vehicles and motorcycles.</p> <p>A customs driven program in terms of which the customs value of components imported for the manufacture of motor vehicles are liable to customs duty.</p> <p>Ad valorem customs and excise duty which is applicable to imported as well as locally produced motor vehicles.</p> <p>Items (1) and (2) are applicable to motor cars, motor vehicles for the transport of ten or more persons of a vehicle mass not exceeding 1,600 kg., motor vehicles for the transport of goods of a vehicle mass not exceed 2,000 kg., or a GVM not exceeding 3,500 kg. or a mass not exceeding 1,600 kg. or a GVM not exceeding 3,500 kg. per chassis fitted with a cab and chassis fitted with engine of Heading No. 87.06 of a mass not exceeding 3,500 kg.</p> <p><i>Heavy duty vehicles:</i> certain components are liable to customs duty and the balance allowed under full rebate of customs duty.</p>	<p>Provision is made that the value of the imported components can be reduced by a duty free allowance as well as the value of imported rebate credit certificates. Customs duty is only payable on the remaining customs value.</p>	<p>30 percent as of January 1, 2007, with an annual reduction of 2 percent until it reaches 20 percent</p> <p>0.00003 times the value for ad valorem duty purposes, less 0.75 percent, with a maximum of 20 percent</p> <p>Chassis fitted with engines: for vehicles not exceeding 3 500 kg. or a GVM not exceeding 1 600 kg. – 30 percent; any other - 20 percent</p> <p>Driving axles: 20 percent</p> <p>Gear boxes: 20 percent</p> <p>Cabs/bodies for motorcars: 30 percent</p> <p>Cabs/bodies for other vehicles: 20 percent</p> <p>Pneumatic tires: 20 percent</p>

Tax	Nature of Tax	Exemptions and Deductions	Rates
4.6. <i>Air passenger tax</i> Customs and Excise Act No. 91 of 1964, as amended	Central government levy on international air travel	Exemptions include: children under 2 years of age; passengers carried 'not for reward'.	R 120 on international travel to all destinations, except Botswana, Lesotho, Namibia and Swaziland where the charge is R 60.
<b>5. Taxes on international trade transactions</b>			
5.1. <i>Customs duties</i>			
Customs and Excise Act No. 91 of 1964, as amended	<p>A one-column tariff schedule based on the Brussels nomenclature with general, most favored nation, and preferential rates of duty.</p> <p>There is a customs union (SACU) with Botswana, Lesotho, Namibia and Swaziland.</p> <p>There is a trade agreement with the European Union, which provides for progressive reduction and elimination of duties over 5-12 years from 1999, depending on the type of good.</p> <p>There is a trade agreement with other members of the South African Development Community (2000), which provides for a phased reduction and eventual elimination of duties over eight years.</p>	<p>Rebates are allowed for certain goods used in manufacture by approved industries (e.g., textiles, motor vehicle production) or by particular institutions and bodies.</p> <p>Duty free import is allowed once per person during 30 days for new and used goods up to R 3,000 per person with separate provisions for alcoholic beverages, tobacco and perfumes.</p>	<p>Import duties vary widely. There are approximately 12 tariff bands excluding specific rates of duty. Specific duties apply to approximately 220 categories and in particular to agricultural products (e.g., meat, fish, vegetables, fruit, and tea) and textile products. Of the 6 700 tariff categories, 3 705 are free of duty. Within the 12 tariff bands, 2 775 categories attract the following rates:</p> <p>1 to 5 percent – 222 6 to 10 percent – 549 11 to 15 percent – 663 16 to 20 percent – 519 21 to 25 percent – 384 26 to 30 percent – 172 31 to 35 percent – 15 36 to 40 percent – 221 41 to 45 percent – 9 46 to 50 percent – 0 51 to 55 percent – 1</p>



Tax	Nature of Tax	Exemptions and Deductions	Rates
<b>6. Other taxes</b>			
6.1. <i>Stamp duties</i>	Ad valorem taxes payable on legal documents such as lease agreements and the transfer and cancellation of marketable securities.	Lease agreements for a duration of five years or less are exempt from stamp duties. Most securities issued by certain public corporations and public authorities are exempt from stamp duty on transfers. Where Uncertificated Securities Tax is chargeable, the transaction does not attract stamp duty. Interest-bearing securities are exempt.	Rates of stamp duty vary for different instruments. Stamp duty is 0.5 percent on rent payable and 0.25 percent on the registration of the transfer of certificates.
Stamp Duties Act No. 77 of 1968, as amended			
6.2 <i>Uncertificated Securities Tax</i>			
Uncertificated Securities Tax Act No 31 of 1998.	Ad valorem tax on the change in beneficial ownership in securities.	Government Departments and public benefit organizations that are exempt from income tax in terms of section 10 (1) (cN) of the Income Tax Act of 1962.	0.25 percent of the value of such securities.