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The Rand Crises of 1998 and 2001: What Have We Learned?

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Over the past ten years, the South African rand has been subject to periodic crises, the causes of which were by no means immediately obvious at the time (Figure 10.1a and 10.1b). This study examines two of these crises episodes, in 1998 and in 2001, and finds that, while both were characterized by intensive pressure on the rand, the policy response, and subsequent macroeconomic performance, were very different.

Between end-April and end-August in 1998, the rand depreciated by 28 percent in nominal terms against the U.S. dollar. This was accompanied by increases of around 700 basis points in short-term interest rates and long-term bond yields, while sovereign U.S. dollar-denominated bond spreads increased by about 400 basis points. At the same time share prices fell by 40 percent and output contracted during the third quarter of 1998 (quarter-on-quarter). In 2001, the rand depreciated by 26 percent in nominal terms against the U.S. dollar between end-September and end-December, but short-term interest rates remained stable, long-term bond yields increased by less than 100 basis points and sovereign U.S. dollar-denominated bond spreads narrowed by about 40 basis points. Share prices rose by 28 percent, and real GDP increased.

These differences in macroeconomic developments during the two currency depreciations can in part be explained by the different economic policy responses. In 1998, the South African Reserve Bank's (SARB) intervention policy—both via official reserves and short-term interest rates—exacerbated the crisis and deepened its macroeconomic impact. In 2001, however, the

authorities abstained from intervention and the crisis receded faster, without severe macroeconomic consequences.

Assessing the Timing and Extent of the Crisis

Simply looking at movements in the exchange rate can provide a misleading picture of the duration and magnitude of a foreign exchange crisis, since exchange market pressures may not be reflected solely in the value of the currency. For example, the exchange rate may remain relatively stable if the central bank successfully intervenes to resist the pressure, although such intervention may simply delay rather than avert a currency depreciation; exchange market pressure in this case would manifest itself in a substantial rise in interest rates and/or a sharp decline in net international reserves.

In order to assess the timing and extent of pressures in the foreign exchange market, we follow an approach that has become standard in the currency crisis literature since Eichengreen, Rose, and Wyplosz (1996). A monthly index of exchange market pressure (EMP) was constructed by taking into account movements in the exchange rate, foreign exchange reserves, and short term interest rates:

$$EMP_t = \alpha \Delta ER_t + \beta \Delta R_t + \gamma \Delta I_t \tag{1}$$

where ΔER, ΔR, and ΔI are the monthly changes in, respectively: the rand per U.S. dollar (percent change), the NOFP (net international reserves adjusted for the forward market liabilities of the central bank), and the three-month treasury bill rate. The sign of the variables is adjusted so that a positive sign is associated with a pressure: a depreciation, a loss of reserves, and an increase in the interest rate. The weights (α, β, γ) are equal to the inverse of the sample standard deviation, calculated over the period January 1996–March 2003, of each of the components.

The crisis index *(CRISIS)* is defined as

$$CRISIS_t = 1, \text{ if } EMP_t > \mu_{EMP} + 1.645 \, \sigma_{EMP}$$

$$= 0, \text{ otherwise,}$$

where μ_{EMP} and σ_{EMP} are, respectively, the mean and the standard deviation of the calculated index. The threshold "1.645" is chosen so that, over the whole sample, 5 percent of the monthly index values will exceed that threshold, if the values are distributed normally.[1]
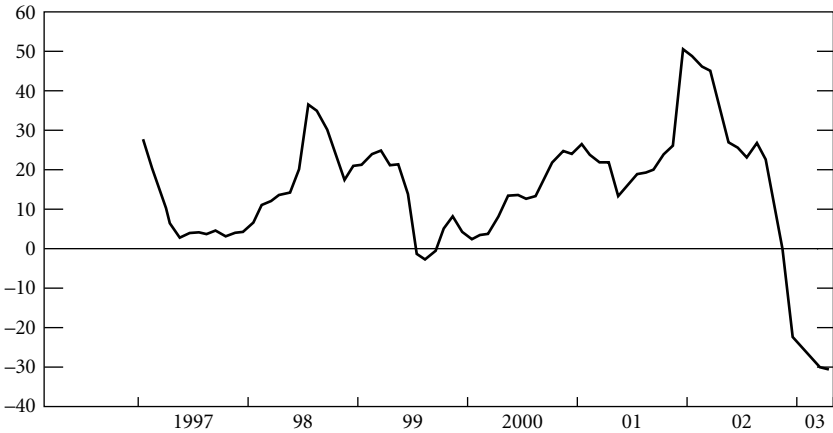
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[1]Derived from a one-sided confidence interval of 95 percent significance.

Figure 10.1a. Rand per U.S. Dollar
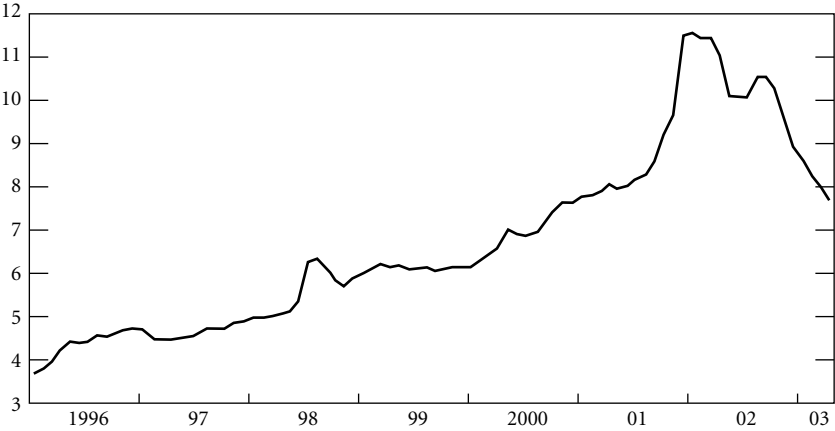
Source: South African Reserve Bank.

Figure 10.1b. Rand per U.S. Dollar
(Annual percent change)

Source: South African Reserve Bank.

Similar indices can be constructed for each of the three components:

$$CRISIS\ X_t = 1, \text{ if } X_t > \mu_X + 1.645\ \sigma_X$$
$$= 0, \text{ otherwise,}$$

Table 10.1. Indicator of Exchange Rate Market Pressure (EMP) and Its Normalized Components in 1998 and 2001

	1998 Crisis Indicator				2001 Crisis Indicator			
	ΔER	ΔR	ΔI	*EMP*	ΔER	ΔR	ΔI	*EMP*
April	—	—	—	—	—	—	—	—
May	—	4.7	—	2.3	—	—	—	—
June	—	4.2	4.2	4.4	—	—	—	—
July	4.0	—	4.1	4.0	—	—	—	—
August	—	—	—	—	—	—	—	—
September	—	—	2.6	—	—	—	—	—
October	—	—	—	—	1.7	—	—	—
November	—	—	—	—	—	—	—	—
December	—	—	—	—	4.6	—	—	2.5
January	—	—	—	—	—	—	—	—
February	—	—	—	—	—	—	—	—

Note: The components are depreciation (ΔER), loss of reserves (ΔR), rise in interest rates (ΔI). Values of the indicator as well as of the components are normalized (i.e., demeaned and then divided by their respective standard deviation). Only values exceeding the threshold are reported (see text). Other values shown as "–".

where *X* is: ΔER, ΔR, or ΔI. For example, *CRISIS* ΔER would be equal to 1 in a given month if in that month the depreciation was larger than the mean depreciation of the sample by an amount that is in excess of 1.645 times the sample standard deviation of the depreciation. These additional indices allow one to identify the source of the exchange market pressure.

Table 10.1 shows the months in which each crisis indicator reaches the threshold, that is, when the overall index, or one of the components, deviated from the mean value by more than 1.645 times the standard deviation. When the threshold is passed, the index (*EMP*, ΔER, ΔR, and ΔI) is presented as normalized (i.e., demeaned and then divided by its standard deviation), in order to provide comparability. Despite the impression conveyed from Figure 10.1, it is interesting to note that the framework employed here suggests that exchange market pressure was greater in 1998 than in 2001, as indicated by the size of *EMP*.

In 1998 the crisis began in May. The authorities reacted with strong policy action, at first in terms of reserve intervention and then by also raising interest rates.[2] This policy response did not stem the pressure, which resulted in a sizable depreciation in July. In 2001, the rand came under heavy

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[2]The SARB obtained foreign exchange reserves by swapping rand for U.S. dollars in the forward foreign exchange market, an operation that involves automatic sterilization.

Figure 10.2. Crisis Indicators
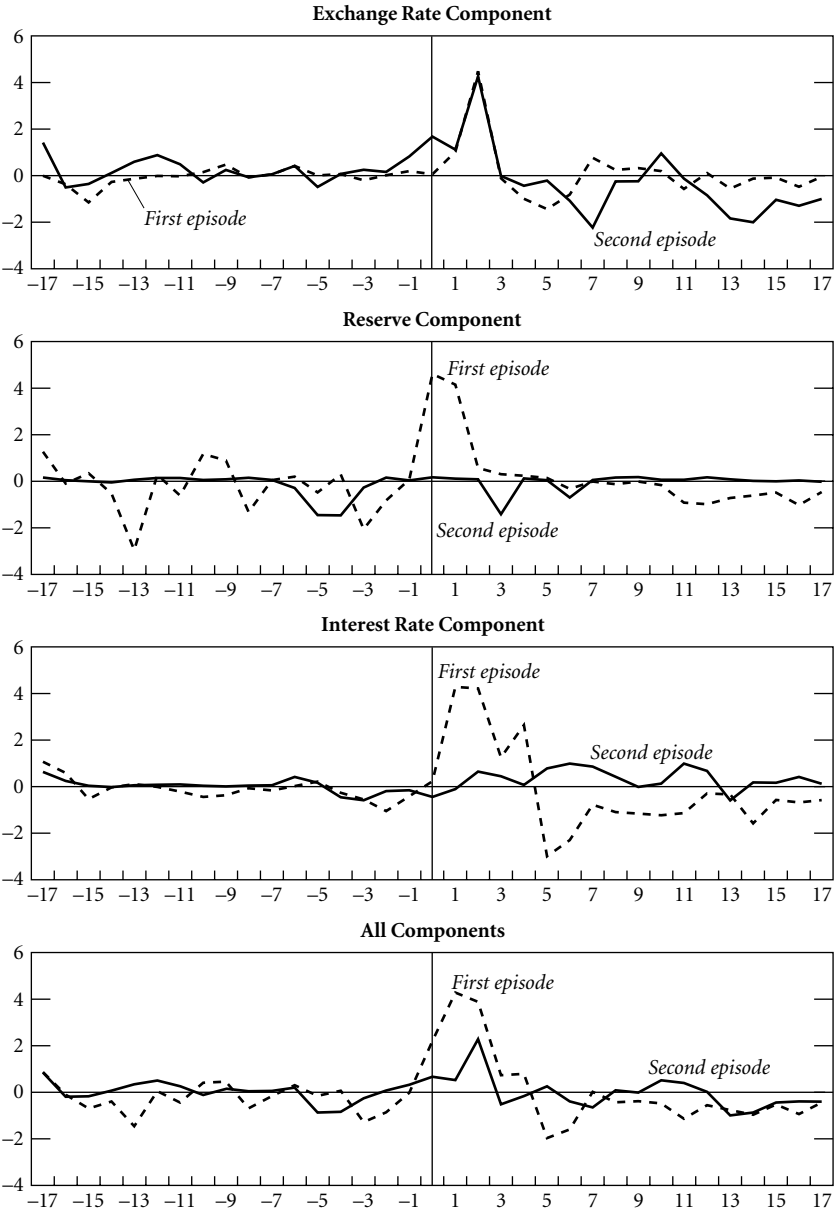
Exchange Rate Component

Reserve Component

Interest Rate Component

All Components

Sources: South African Reserve Bank and author's calculations.

Note: Horizontal axis reports months from reference period (first episode = May 1998, second episode = October 2001).

pressure between October and December, but the SARB did not intervene or raise interest rates during this period.

Figure 10.2 compares the normalized crisis indicators (both the components and the overall index) across the two episodes. The reference point (or time = 0 on the horizontal axis) for the time series of the indicators is provided by the inception of the exchange rate market pressure. Table 10.1 suggests that such inception points can be associated with May 1998 and October 2001.

On the basis of the methodology used, one can conclude that the 1998 crisis covered the period May–September, while that in 2001 began in October, but intensified only in December. Although the extent of currency depreciation was perhaps somewhat greater in 2001, overall market pressures were far more intense and covered a longer period of time in 1998. The next section presents some reasons why.

What Can Explain the South African Rand Crises?

There had been some notable gains in macroeconomic performance in South Africa since 1994, which make the task of finding explanations for the exchange rate pressures in 1998 and 2001 even more challenging. Here we assess several potential factors that have been put forward by market analysts as explanations of why the rand depreciated significantly in 1998 and 2001. We also draw on the report of the Myburgh Commission of Inquiry that was appointed by the President of South Africa to investigate the causes of the rand depreciation during the fourth quarter of 2001.

Macroeconomic Performance

South Africa had made significant gains in macroeconomic stability since 1994. These included a continued strengthening in fiscal performance and inflation—for example, the overall fiscal deficit in 2001 was slightly lower than the already prudent target of 1.5 percent of GDP and preparations for the move to full inflation targeting were advanced. However, there was an acceleration in money growth in the summer of 2001, suggesting that the depreciation may have been a case of exchange rate overshooting as described by the Dornbusch (1976) model of exchange rate dynamics. There are significant challenges in testing this hypothesis empirically using regression analysis because of the difficulty of identifying and then controlling for other factors that were also affecting exchange rate dynamics at the time of the currency market pressures.

Delays in Privatizing Telkom and Slowing Reform Momentum

The South African government's progress with its privatization agenda was seen by some as a litmus test of the government's general commitment to reform. In this regard, the privatization of Telkom initially announced by the South African government to take place in 2001 was seen as key. However, the privatization was delayed, partly because the weakening of global stock markets would imply a much lower price for Telkom. This delay may have had a negative impact on sentiment toward the rand, both because the financial markets started doubting the government's commitment to economic reform, and because the receipts from the privatization were expected to be used to reduce the forward book—so that a lower price meant a lower reduction in the forward book than initially expected.[3]

The SARB's Net Open Forward Book

The SARB's forward book was a source of vulnerability. Large short-term liabilities and low reserve adequacy have been found to increase the probability of exchange rate pressure and to raise sovereign spreads.[4] A sizable forward book was inherited from the apartheid regime. However, despite some repayment efforts, the book remained large for several years, mainly because of the SARB's intervention policies during periods of exchange market pressure. In 1996 and 1998, for example, the SARB intervened heavily in the foreign exchange market (with net losses of around $14 billion and $10 billion, respectively, that is, 10 percent and 8 percent of GDP), and borrowed in the forward market.[5] As a consequence, there was a large buildup in the SARB's NOFP.[6]

Subsequently, the SARB decided on an explicit policy to gradually draw down the NOFP, which some market analysts viewed as a source of vulnerability for the rand. While market conditions were favorable and the rand was stable, the policy of reducing the NOFP was an appropriate policy response to strengthen the ability of the South African economy to with-

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[3]The forward book was the SARB's position in the forward market.

[4]See Chapter 11.

[5]The SARB entered into a swap agreement with a counterpart bank exchanging rand in return for U.S. dollars with an obligation to reverse the transaction at a future specified date. The SARB then sold the U.S. dollars it received in the spot foreign exchange market. The first leg of the transaction would inject liquidity into the banking system, while the second leg would reverse it.

[6]The NOFP (the net open forward position) is the SARB's open position in the forward market less its net international reserves.

stand future shocks by building up foreign exchange reserves. However, once the rand came under significant pressure in late 2001, some analysts regarded the policy of drawing down the NOFP as inappropriate in these circumstances, given that it would contribute to the excess demand for foreign currency and was likely to reduce the likelihood that the SARB would intervene to support the rand.

Enforcement of Existing Capital Controls

On October 14, 2001, the SARB announced that it would tighten the enforcement of exchange controls. A number of observers, including some who testified before the Myburgh Commission, argued that this announcement reduced market liquidity and thereby contributed to the sharp rand depreciation. However, it is difficult to detect such an effect in the market data. First, while turnover in the foreign exchange market undoubtedly declined in the fall of 2001, it remained well over $1 billion a day. Second, the main depreciation of the rand occurred somewhat later, in December. Third, tentative analysis by IMF staff found no discernible correlation between the bid-ask spreads (an indicator of exchange rate pressure) and the fall in market turnover in October 2001.[7]

Commodity Prices and External Current Account

Commodity prices are likely to have played a role in the rand weakness in 1998. That year, global demand for commodities had weakened on the back of the Asian financial crisis putting downward pressure on the market prices of some of South Africa's commodity exports and probably contributed to the large depreciation of the rand in July of that year (see SARB, *Quarterly Bulletin*, December 1998). Analysis discussed in Chapter 9 indicates that a 1 percent fall in the real price of commodities exported by South Africa is associated in the long run with a real exchange depreciation of 0.5 percent.
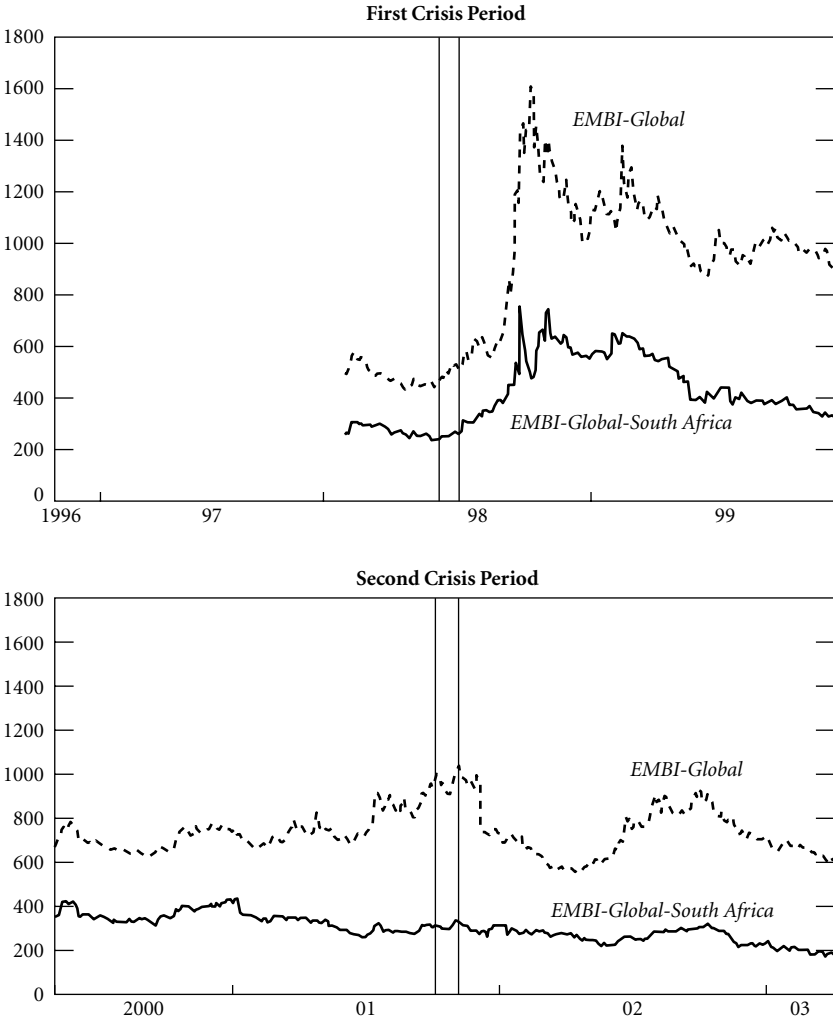
In 2001, the slowdown in global economic activity that began in 2000 and continued into 2001 may also have had a negative impact on the rand as world demand for South African goods and services moderated.

Contagion

There is little evidence that contagion from turmoil in other emerging markets triggered the rand depreciations in 1998 or 2001. Empirical evidence

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[7]Unpublished work by Matthias Vocke.

Figure 10.3. Spreads
(In basis points)

First Crisis Period

EMBI-Global

EMBI-Global-South Africa

Second Crisis Period

EMBI-Global

EMBI-Global-South Africa

Sources: J.P. Morgan and author's calculations.

suggests that the main variables that can increase a country's vulnerability to contagion are financial linkages to the crisis country via a common creditor, low levels of foreign reserves relative to level of short-term debt, and slow growth (see Caramazza, Ricci, and Salgado, 2004). Fallout from the Asian financial crisis of 1997 and the Russian debt default in 1998 meant that sen-

timent toward emerging market currencies was generally fragile (generating a flight to safe havens such as U.S. dollar assets). However, contagion cannot really explain the rand depreciation in May 1998 since the latter came several months after the Asian crisis, and clearly before the Russian default in August 1998. Figure 10.3 shows that neither the Emerging Market Bond Index (EMBI) nor the South African spread increased right around the first crisis episode.

In late 2001, deteriorating market and economic conditions in Argentina had a minimal spillover effect on emerging markets and so were unlikely to have played a role in the depreciation of the rand—as evidenced by the falling EMBI spread for South Africa (see Figure 10.3). However, some have argued that the rand suffered from other external factors, such as the political and social turmoil in neighboring Zimbabwe, which could have spilled across the border into South Africa.

Financial Market Dynamics: The Role of Highly Leveraged Institutions

Highly leveraged institutions (HLIs) may have played some role in deepening the extent of the rand depreciation in 1998. As part of its investigations into the activities of HLIs, the Financial Stability Forum (FSF) report (2000) included a discussion of South African markets. It found HLIs to have played an important part in explaining the dynamics of South African financial markets in 1998—a finding which suggests that financial market shocks were an important source of the marked increase in rand volatility in 1998. The FSF report pointed out that in 1998 some institutions were selling the rand short, thus driving up domestic interest rates. These same investors were also selling short government securities and making a profit when bond prices fell as interest rates spiked. This, however, contrasts with the experience in 2001 when the dynamics were very different and yields on government securities and long-term bonds remained stable for most of the crisis period. Indeed, in contrast to the generalized stress in South African financial (stock, bond, and foreign exchange) markets in 1998, in 2001 the Johannesburg stock market rallied sharply on the back of expectations of improved competitiveness and higher returns (in rand) on export-oriented stocks.

AIDS and Unemployment

While the high incidence of AIDS and unemployment do not explain the exchange rate pressures in 1998 and 2001, they nevertheless increase the general vulnerability of the rand to sudden changes in market sentiment,

as they present serious economic and social challenges for policymakers. Consequently, what might otherwise be a smooth downward adjustment in the rand in response to economic shocks could instead become currency instability.

An Empirical Analysis of the Causes of the Crises

Using an empirical exchange rate model set out in Clarida and Gali (1994), Bhundia and Gottschalk (2003) model the dynamics of the rand. The authors then decompose the forecast error (or "surprise" movements in the rand) into nominal shocks, real supply shocks, and real demand shocks.[8] They find that nominal shocks were the primary driving force behind the unexpected depreciation of the rand in both 1998 and 2001.[9] By construction, and in keeping with economic theory, nominal shocks have no long-run impact on equilibrium of the economy. However, there are several types of shocks that would be consistent with the nominal shocks identified in the model, including changes in money supply, or financial markets shocks such as market speculation.

Since a broad range of events is consistent with observing nominal shocks, it is difficult to pinpoint which "nominal" events were most important for explaining the rand depreciations in 1998 and 2001. For example, in 2001, contagion from events in Zimbabwe may have heightened risk aversion among investors when considering South African investment opportunities. Other potential sources for the nominal shocks include the acceleration in money supply growth from around mid-2001 which was associated with an overshooting of the exchange rate by late 2001. As discussed before, this last interpretation is closely related to the predictions presented in Dornbusch's (1976) seminal paper on exchange rate dynamics. Further research should focus on disentangling which of the nominal events discussed in the previous section are the most likely causes of the rand depreciations.

Macroeconomic and Policy Performance Around the Two Depreciation Episodes

The previous section indicated that the 1998 and 2001 crises originated from nominal shocks induced by either relaxed monetary policy stance or

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[8]This particular exchange rate model allows one to identify only these three unique shocks.
[9]Nominal shocks are defined broadly and would be consistent with monetary policy shocks, or shocks to financial markets, among others.

shifts in financial markets expectations. This section compares across the two episodes the policy behavior and the macroeconomic performance, which—despite the similar origin for the crisis—differed markedly. As discussed in the section "Assessing the Timing and Extent of the Crisis," the reference point for the comparison—that is, the inception of the exchange rate market pressure—can be found in May 1998 (or 1998Q2) and October 2001 (or 2001Q4). We investigate, therefore, the behavior of macroeconomic and policy indicators during the months that preceded and followed the two reference points (a window of five quarters or 17 months is chosen for convenience).

Several facts characterize the two episodes.

- As discussed earlier, the extent of the depreciation appears similar in the two episodes, but the overall exchange market pressure was stronger in 1998 (see Figures 10.2 and 10.4).

- The policy reaction was much more interventionist in the first episode. To stem the pressure on the rand, the central bank borrowed foreign currency in the forward market and sold it in the spot market. As a result, the net open foreign position (i.e., net international reserves minus forward liabilities of the central bank) declined by $10 billion between April and September 1998. Such sterilized intervention quickly proved ineffective, also because it was hard to build confidence in the period right after a global currency crisis. To step up intervention, the central bank had soon to increase its repo rate: short-term rates increased from 13 percent in May 1998 to almost 22 percent in September 1998. During the same period, long-term government bond rates increased from 13 percent to 18 percent. In the second episode the central bank abstained from intervention, in terms of both reserves and interest rates (Figure 10.5), apart from policy actions necessary to counteract the second-round inflationary consequences of the depreciation.

- The macroeconomic performance of the South African economy deteriorated more heavily in the first episode. Quarterly growth declined by 2 percentage points immediately after the inception of the 1998 depreciation and investment faced a major contraction, partly induced by the large increase in real interest rates (see Figure 10.6). Export performance did not present unusual signs of distress, as it was probably supported by the sudden gain in competitiveness. In the second episode, no major macroeconomic repercussions were visible.

Figure 10.4. Exchange Rate Behavior
(Reference period = 100)
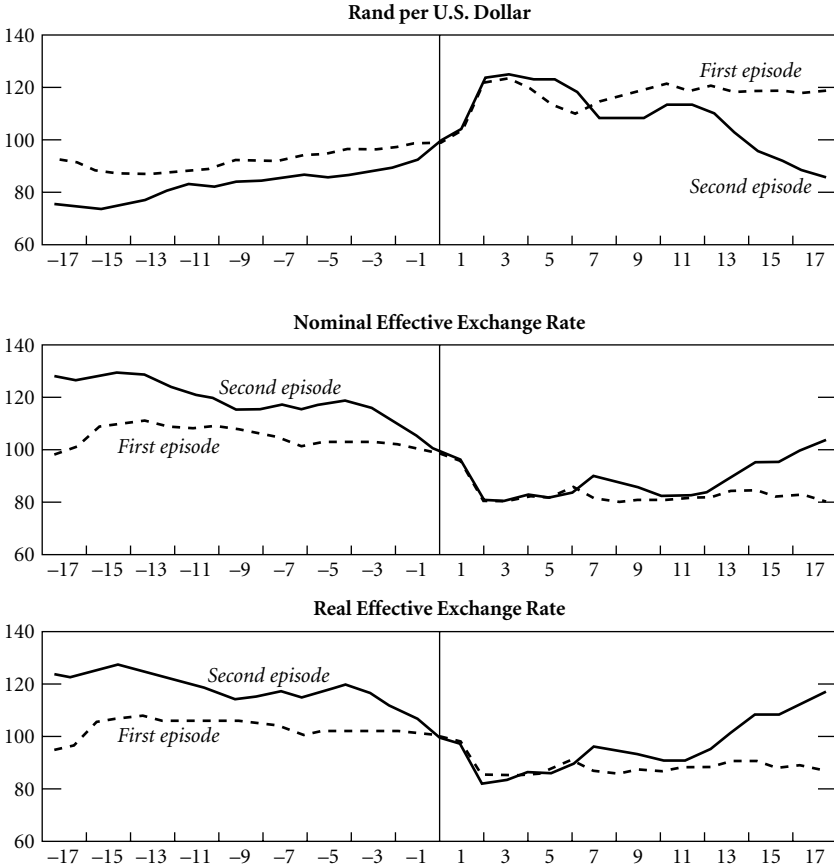
Rand per U.S. Dollar

Nominal Effective Exchange Rate

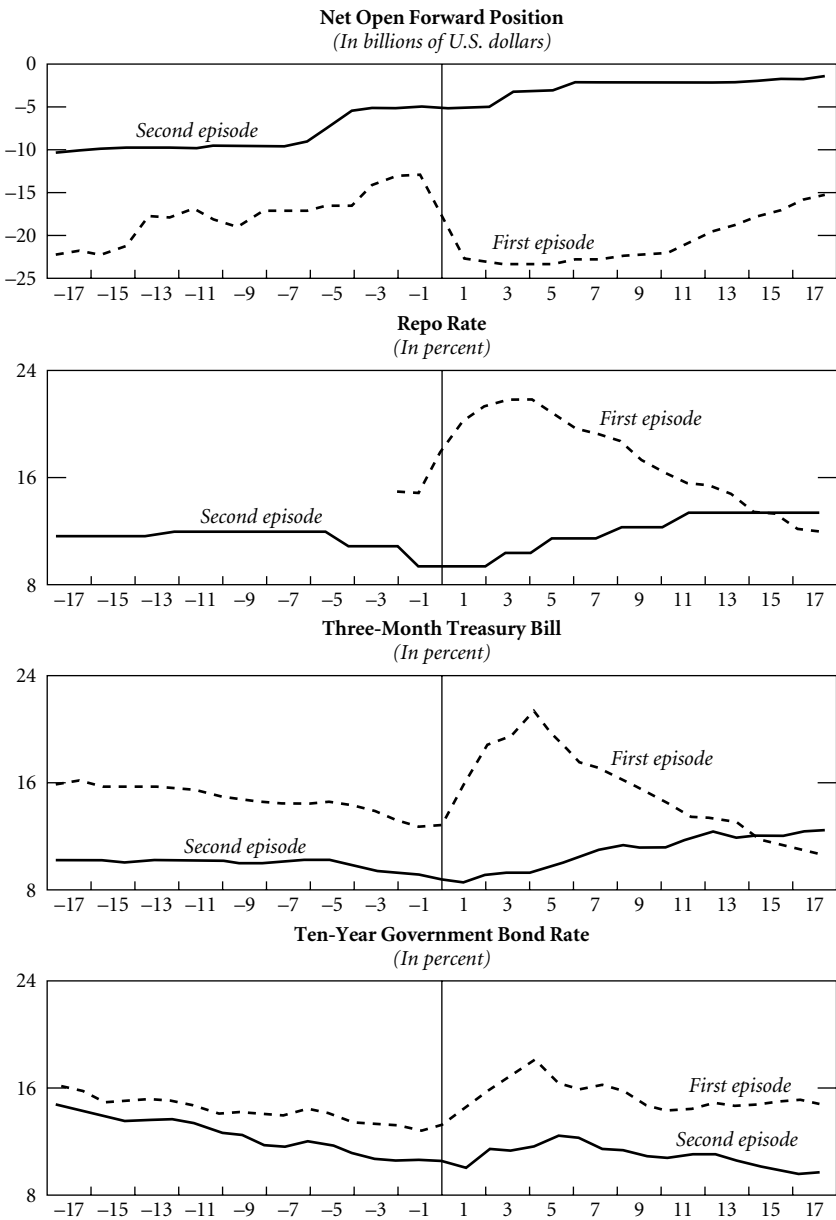**Real Effective Exchange Rate**

Sources: South African Reserve Bank and author's calculations.
Note: Horizontal axis reports months from reference period (first episode = May 1998, second episode = October 2001).

- Inflation performance was somewhat worse in the second crisis, reflecting a sizable increase in local commodity prices, a more relaxed monetary policy, and stronger growth (Figure 10.7).[10]
- Figure 10.8 shows that financial markets perceived a substantial worsening of the economic outlook immediately after the inception of the

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[10]In addition, maize prices increased by more than 200 percent in 2000–01, due to regional shortages that induced a shift from export to import parity (about 70 percent markup), the rand depreciation (40–50 percent), and an increase in the world price of maize (20 percent).

Figure 10.5. Reserves and Interest Rates

Net Open Forward Position
(In billions of U.S. dollars)

Second episode

First episode

Repo Rate
(In percent)

First episode

Second episode

Three-Month Treasury Bill
(In percent)

First episode

Second episode

Ten-Year Government Bond Rate
(In percent)

First episode

Second episode

Sources: South African Reserve Bank and author's calculations.
Note. Horizontal axis reports months from reference period (first episode = May 1998, second episode = October 2001).

Figure 10.6. Growth, Investment, and Export Performance
(Annual percentage change)
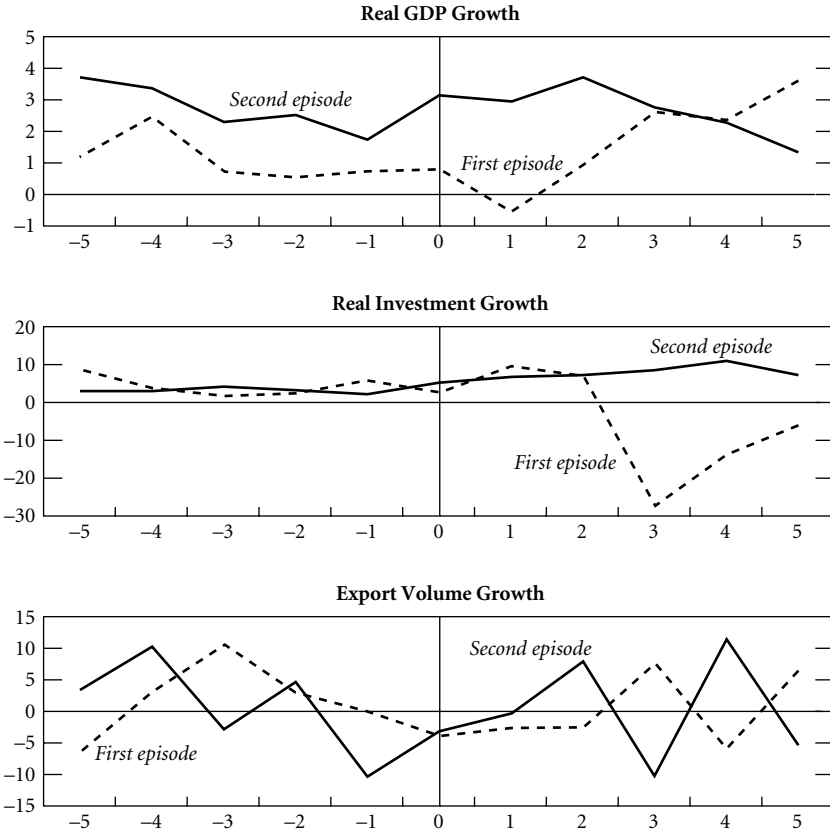
Real GDP Growth
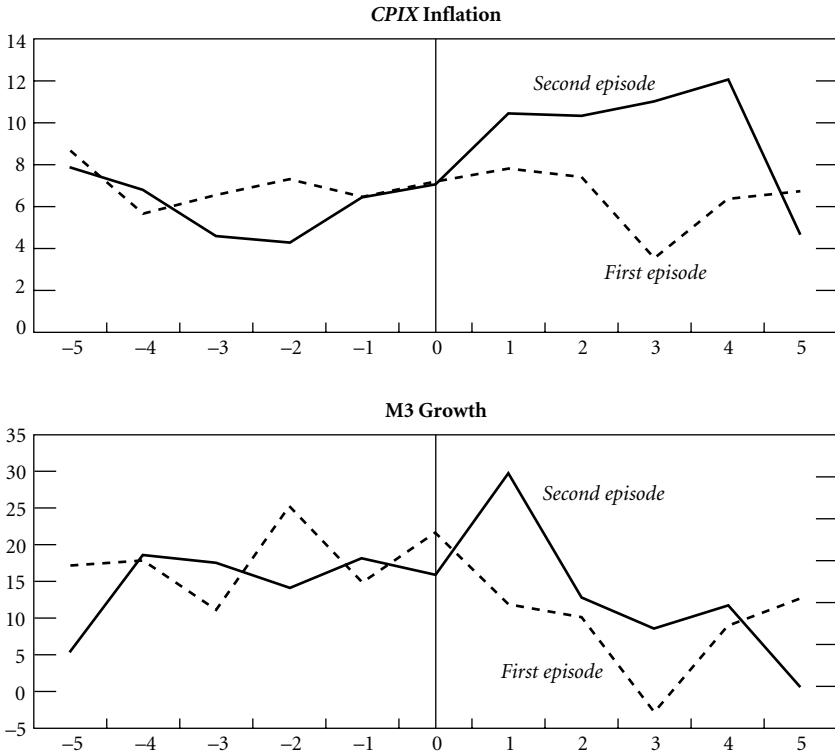
Real Investment Growth

Export Volume Growth

Sources: South African Reserve Bank and author's calculations.

Note. Horizontal axis reports quarters from reference period (first episode = 1998Q2, second episode = 2001Q4).

1998 crisis: both in rand and in U.S. dollar terms, the stock market declined heavily and remained below initial level for more than one year. In 2001, however, such a pattern is not visible: the stock market gained value in rand terms.

Conclusions

A comparison of the policy actions in 1998 and 2001 provides some key policy lessons. Leaning against the wind of foreign exchange markets may

Figure 10.7. Inflation and Money Growth
(Annual percentage change)

CPIX Inflation

Second episode

First episode

M3 Growth

Second episode

First episode

Sources: South African Reserve Bank and author's calculations.
Note. Horizontal axis reports quarters from reference period (first episode = 1998Q2, second episode = 2001Q4).

be a fruitless and costly exercise. In 1998, increasing interest rates proved to be of limited effectiveness in fighting depreciation pressures, and proved to be costly for investment and growth. Intervention in the foreign exchange market was also ineffective in stemming heavy pressure on the exchange rate, both because it was sterilized and because it entailed a large buildup of foreign obligations that limited the credibility of the policy choice.

Recent studies show that a buildup of a central bank's foreign currency exposure can put upward pressure on long-term interest rates (see Chapter 13) and increase exchange rate volatility (see Chapter 11). Moreover, should authorities attempt to regain reserves (as they did in order to eliminate the forward book), this may induce a temporary depreciation of the exchange rate (see Chapter 9). South Africa is also likely to suffer much less

Figure 10.8. All Share Index
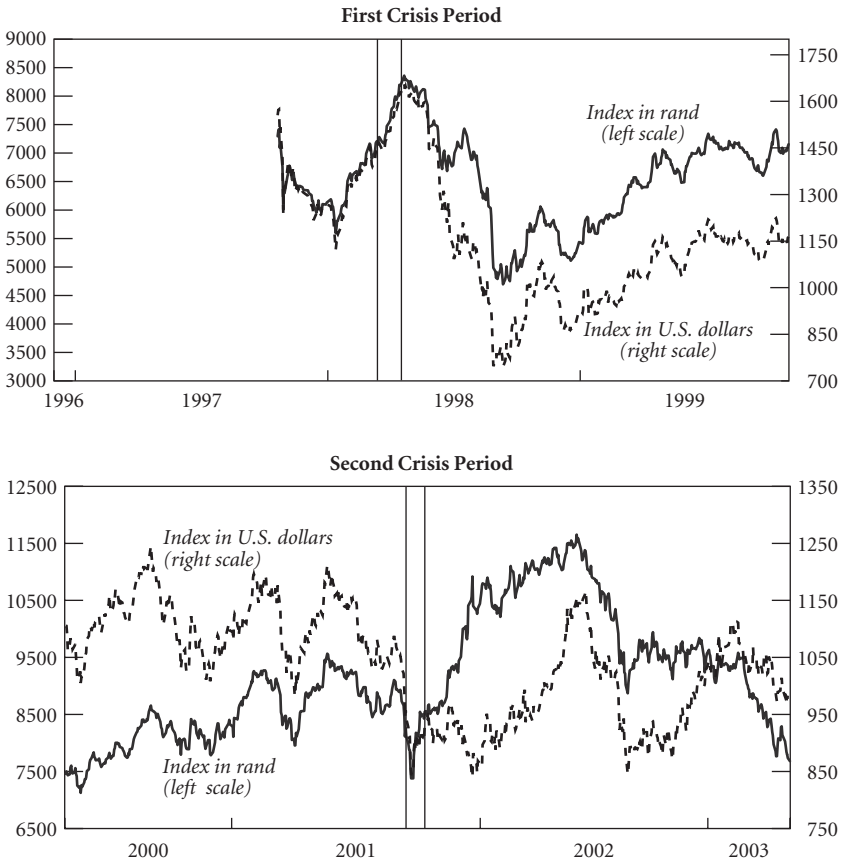
Sources: South African Reserve Bank and author's calculations.

from the consequences of large exchange rate swings than many other emerging market countries, as the lack of a large foreign currency exposure limits the financial repercussion of a depreciation via balance sheet effects.

The South African authorities have acknowledged that the intervention policy in 1998 was inappropriate. They avoided adopting the same intervention policy in 2001, which proved to be a very successful strategy as the macroeconomic repercussions of the crisis were limited and the rand strengthened over the next few years. The successful management of the currency crisis in 2001 was a reflection of a broader improvement in the overall macroeconomic policy framework, which helped to strengthen policy credibility. For example, the forward book has been progressively dis-

mantled since 1998. Fiscal consolidation had been ongoing for several years and brought fiscal deficit to prudent levels. Also, the adoption of an inflation-targeting framework successfully provided a more credible nominal anchor for exchange rate expectations.

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