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8.1 Introduction

This chapter examines a pair of challenges that will confront the Central Bank of Kenya (CBK) as the country enlists foreign capital flows in support of *Vision 2030*. The first is maintaining macroeconomic stability – a pillar of *Vision 2030* – in a context of increasing capital mobility. The second is supporting export competitiveness in the context of large capital inflows and a major infrastructure push.

Private capital flows can be a source of stability by promoting credit and risk-sharing across borders. They can also undermine macroeconomic stability, however, by exposing domestic markets to external volatility and sharpening the trade-offs between competing objectives of monetary policy. The first half of this chapter takes a descriptive and empirical approach to capital mobility in Kenya. We characterize in turn the *de jure* and *de facto* openness of Kenya's capital account, the degree to which private capital flows already influence the environment for monetary policy, and the determinants of vulnerability to a costly reversal of inflows. Our findings are consistent with a situation of imperfect capital mobility, in which monetary policy can pursue multiple targets over the short run. This scope can rapidly disappear, however, when

targets are sharply inconsistent or when economic or political shocks interact with pre-existing vulnerabilities. Anticipating a potentially sharp increase in capital inflows, we emphasize the looming importance of the celebrated trilemma of monetary policy and the importance of prudential and regulatory instruments in achieving a favourable balance of expected returns and macroeconomic risks. These include adjustments in the exchange control regime, policies to facilitate private markets for foreign exchange risk, and policies to monitor and limit macroeconomic vulnerabilities.

The second half of the chapter addresses the role of monetary policy in supporting export competitiveness – a more controversial issue, both from a theoretical perspective and from the viewpoint of Kenya's current monetary framework. Policy-makers in Kenya have historically avoided severe exchange rate overvaluation, and the cross-country evidence suggests that continuing this record will be important in achieving the ambitions of *Vision 2030*. But should the CBK actively target an undervalued shilling? Given the importance of export growth for employment and economy-wide productivity, the question deserves debate. We review the issues and conclude that, for Kenya, the policy instruments that matter most for export success lie outside the realm of monetary policy. These include the reliable provision of productivity-enhancing public inputs and the protection of private economic returns from investment – policies emphasized in the economy-wide growth diagnostics of Chapter 3. There may nonetheless be episodes during which resisting appreciation pressures is fully consistent with maintaining a strong inflation anchor.

## 8.2 Maintaining macroeconomic stability

Kenya adopted a unified and flexible exchange rate in the early 1990s, as part of a market-based reform programme designed to improve the investment environment and spur economic growth (Mwega and Ndung'u, 2008). By 1995, these reforms went beyond the abandonment of exchange controls on exports and imports to include the removal of a number of long-standing restrictions on capital flows. Taking a comparative approach, we briefly document the opening of the capital account and consider its implications for investment and macroeconomic management in Kenya. We then turn to evidence on the degree of capital mobility and its interaction with monetary policy.

8.2.1 Opening the capital account

Ndung'u and Ngugi (1999) describe the liberalization of exchange controls in detail. Following the removal of interest rate controls in 1991, the CBK introduced tradable foreign exchange bearer certificates, effectively creating a dual exchange rate system in which the bulk of foreign exchange transactions

continued to take place at the official rate. The free exchange rate started to acquire greater importance as exchange controls were liberalized, but in late 1992, relations with external donors deteriorated during the run-up to the country's first multiparty presidential election. During the first half of 1993, reforms were temporarily reversed in the midst of a banking sector and balance of payments crisis. The Moi government then renewed the process in mid-1993, and received new commitments from donors. Exchange rate unification then proceeded rapidly: during 1994, the government removed all restrictions on current account transactions, and accepted Article VIII status in the International Monetary Fund (IMF).[2] By the middle of 1995, the government had removed many of the remaining restrictions on the capital account. In June 1995, Parliament repealed the Exchange Control Act.

The appropriate combination of regulations and restrictions on private capital movements remains a topic of vigorous debate among economists (Edwards, 2007; Obstfeld, 2008). How open is Kenya's capital account a decade and a half after the reforms of the mid-1990s? Figure 8.1 adopts a cross-country perspective, comparing a *de jure* measure based on official restrictions with a *de facto* measure based on observed transactions. Panel 1 shows that Kenya was an early and substantial capital account liberalizer, especially within sub-
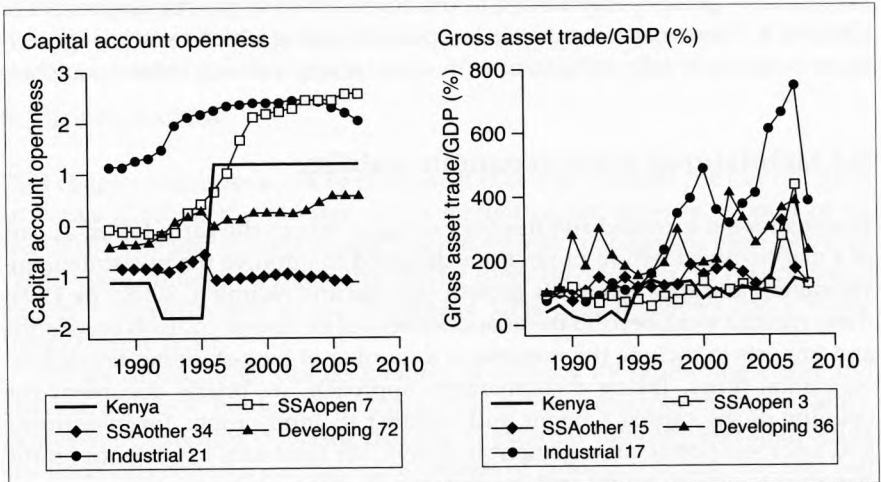
Figure 8.1 Capital account openness, 1988–2008: *de jure* and *de facto*.
We report cross-country averages for various country groups; see the legends for group sizes, which are smaller in panel 2 because of data limitations. Panel 1 includes all countries with a full set of annual observations; panel 2 allows at most one missing observation. The SSAopen 7 includes all countries with a capital account openness index at least as high as Kenya's in 2007 (see text). The 'Developing' category excludes transition economies and SSA. In panel 2, gross capital account trade is the sum of the absolute values of debit and credit entries in the capital and financial accounts of the balance of payments, including errors and omissions and excluding derivatives trade. Balance of payments data are from the IMF's *International Financial Statistics* online.
Sources: panel 1, Chinn and Ito dataset, 2008; panel 2, IMF and CBK.

Saharan Africa (SSA). We use the measure developed by Chinn and Ito (2008), which relies on the detailed annual assessments of exchange restrictions in the IMF's *Annual Report on Exchange Controls and Exchange Restrictions*.[3] By this measure, Kenya vaulted in 1996 from the most closed 7 per cent of developing countries to the most open 25 per cent in terms of capital account openness. As of 2007, Kenya remained one of only eight countries in SSA to fall within the most open 30 per cent of the developing country distribution.[4] Of these eight, however, Kenya's regime was the least liberal, retaining a variety of controls on the ability of non-resident investors to acquire assets and issue liabilities in the local market (see IMF, 2007).

As a measure of *de facto* openness, panel 2 of Figure 8.1 shows the ratio of gross trade in assets – purchases plus sales of financial claims between Kenyans and foreign residents – to gross domestic product (GDP).[5] We emphasize two observations. First, Kenya experienced a substantial once-for-all increase in the volume of capital flows in the mid-1990s, coinciding with its relaxation of restrictions on the capital account. Their trajectory since the mid-1990s is flat, by comparison with increases elsewhere, an observation that corroborates the impression of partial liberalization suggested by the Chinn and Ito measure. Second, however, gross capital flows remain relatively low even by the standards of Kenya's comparatively liberal policy regime. In recent years, gross flows in Kenya have been well below the non-African developing country average and below even the average among countries of SSA with tighter *de jure* restrictions on capital movements. This may in part reflect perceptions of country risk; we provide a rough estimate below of Kenya's risk premium and show that it is above that of a set of comparator countries. Although the sources of this are various, it is likely that perceptions of political instability play a role. Of the large number of international comparisons reported by Kenya Institute for Public Policy Research and Analysis (KIPPRA, 2009) in its comprehensive study of national competitiveness, Kenya's relative performance was weakest by far on investor perceptions of government stability.[6] Below, we show evidence of turmoil in the foreign currency markets around the time of national elections.

8.2.2 Financing investment

Net financial trade can provide an important source of investment financing even if two-way financial trade remains relatively modest as a share of GDP. Figure 8.2 relates investment in Kenya to its ultimate sources in national saving and net financial inflows. Foreign financing – the total amount of which, including the use of official foreign exchange reserves, equals the current account deficit – has indeed played an important role during the period of an open capital account. This is particularly so over the past half decade, during which time a sharp increase in the investment rate has been almost fully matched by an increase in the current account deficit.
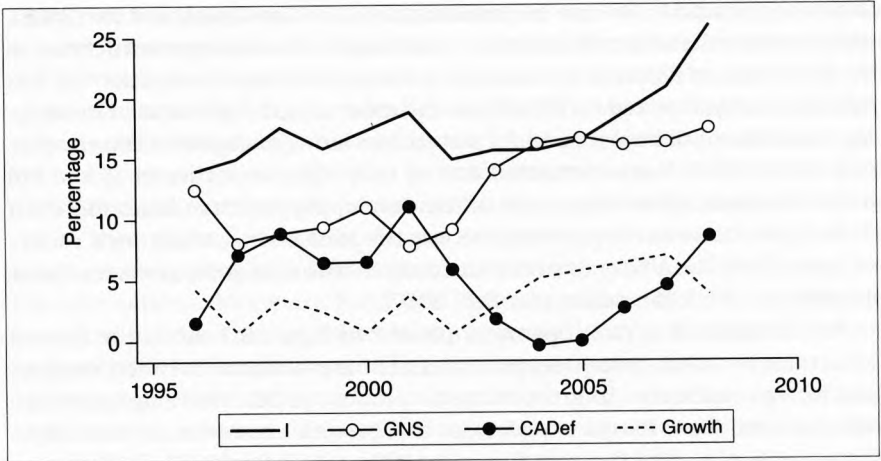
Figure 8.2 Investment, saving, current account deficit, and economic growth, 1996–2008.

National accounts data in national currency at constant 2001 prices are from the World Bank, *World Development Indicators* online. Gross domestic investment (I), gross national saving (GNS), and the current account deficit (CADef) are measured as percentages of gross national disposable income. The identity I=GNS+CADef holds. The current account deficit equals the trade deficit minus the sum of net current transfers and net factor income. Growth is the growth rate of GDP.

The recent confluence of external inflows with increasing rates of investment and growth reflects, at least in part, a vote of confidence by internal and external investors in Kenya's economic prospects. The implied increase in overall net foreign liabilities is nonetheless substantial, and is projected to continue under *Vision 2030*. Although Kenya's external debt position is favourable (see below), this depends in part on a combination of official debt relief and growth rates of exports and GDP that have exceeded the real interest rates on external debt. The global recession and financial crisis have tended at least temporarily to reverse the latter ranking, raising questions of the sustainability of continued current account deficits. Aizenman *et al.* (2007) find that net capital inflows continue to constitute a limited source of investment finance for developing countries despite the sharp increases in global gross capital flows during the 1990s. This suggests that the very substantial further increases in domestic investment being anticipated under *Vision 2030* – the investment target is 30 per cent of GDP – will have to be financed mainly through increases in national saving.

8.2.3 The composition of capital flows

Openness to foreign capital flows provides domestic residents with opportunities for diversification and may contribute to investment by reducing the country's overall cost of capital. It also alters the environment for monetary policy, however, by increasing the degree of *de facto* capital mobility. One of

the central propositions of international monetary economics is that an increase in capital mobility sharpens the trade-off between internal and external objectives of monetary policy. An extreme version of this proposition – the so-called trilemma – states that, when capital mobility is perfect, a country cannot simultaneously pursue an exchange rate target (an external objective) and an interest rate target (an internal objective). One of three elements must be sacrificed: capital mobility must be restricted, the exchange rate must be freed, or domestic policy objectives must be ignored.

Our evidence on gross capital flows suggests that monetary policy in Kenya is in an intermediate position – capital mobility is substantial but far from perfect, so that the CBK has at least limited scope for pursuing interest rate and exchange rate objectives simultaneously. However, the environment for monetary policy is also strongly influenced by the composition of external flows. Liquid short-maturity flows – particularly short-term debt – are widely regarded as more constraining of monetary policy than long-term flows. Their attractiveness to investors, whether domestic or foreign, can depend sensitively on interest rates and exchange rate expectations. Their easy reversibility, moreover, increases the risk of a 'sudden stop': a shift in market sentiment that creates a flight away from domestic assets, such as occurred during the Asian financial crisis of 1997–98 and in a number of emerging market economies during the recent global financial crisis. A sudden stop generates an unpleasant menu of policy choices. The monetary authority can stand aside and allow the shilling to depreciate; it can defend the shilling by raising interest rates; it can finance the outflow by spending international reserves; or it can attempt to stop outflows directly, by tightening exchange controls. The trilemma is at work here, because each of these strategies requires the sacrifice of some domestic or external objective. Depreciation contributes to inflation and may provoke a populist outcry from import-dependent groups including urban wage earners; and it increases the debt burden of domestic entities – banks, firms, or government – that have net foreign currency liabilities. Interest rate increases may contract aggregate demand and endanger the solvency of net debtors, including prominently the public sector; and they can weaken the banking sector, given the maturity mismatch between assets and liabilities. International reserves are limited and costly to rebuild, and as long as interest rates remain low, any perception that the central bank cannot tolerate depreciation may redouble speculative pressures against the currency. Tighter controls may undermine the confidence of portfolio holders further, creating renewed pressure for outflows and discouraging subsequent inflows once the crisis is over; and they may be difficult to remove.

Figure 8.3 provides a summary view of Kenya's external position as it has evolved over the period since 1996. Panel 1 shows that exports of goods and services have doubled in real terms since 2002, and that imports have grown even faster. Aid flows began to recover in the late 1990s following a long decline, but they remain low as a share of overall imports. Panel 2 shows the
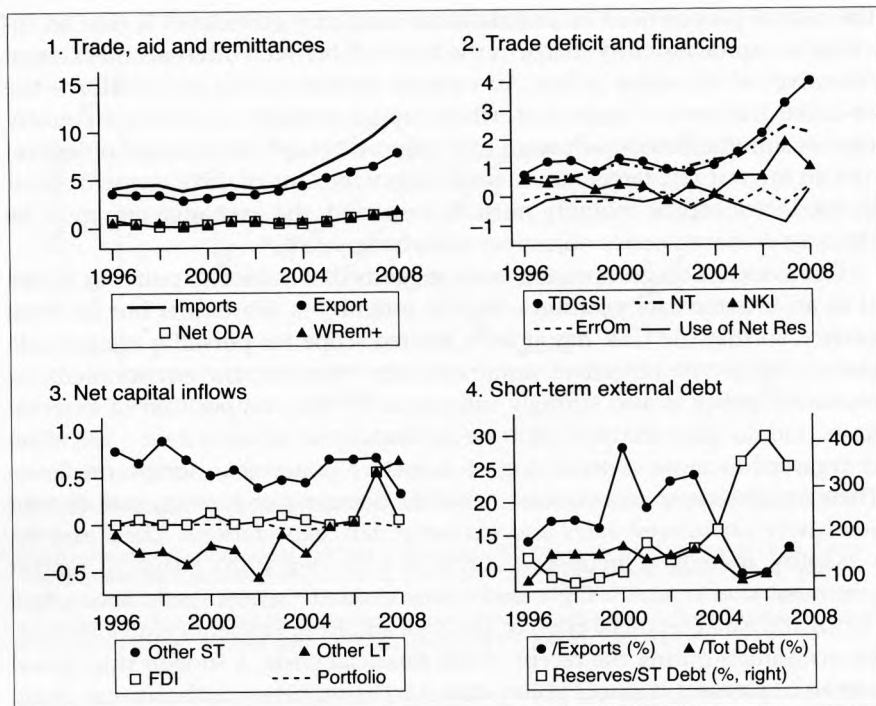
1. Trade, aid and remittances

Imports ● Export
□ Net ODA ▲ WRem+

2. Trade deficit and financing

● TDGSI ···– NT ▲ NKI
––––ErrOm —— Use of Net Res

3. Net capital inflows

● Other ST ▲ Other LT
□ FDI –––– Portfolio

4. Short-term external debt

● /Exports (%) ▲ /Tot Debt (%)
□ Reserves/ST Debt (%, right)

Figure 8.3 Balance of payments, 1996–2007/8.
All variables in panels 1–3 are deflated using the USA GDP deflator. Balance of payments data are from the CBK. Imports and exports are of goods and non-factor services, and TDGSI is the trade deficit on goods, services, and income. The NT and NKI variables are our own constructs: NT (=net transfers) is the sum of net current transfers from the current account and 'capital account, net' from the capital account; we call this variable net transfers because the 'capital account, net' is composed mainly of debt forgiveness and other capital grants. NKI (=net capital inflow) is the sum of net direct investment, net portfolio flows, and net other investments; it corresponds to the financial account of the balance of payments. ErrOm denotes errors and omissions. Use of NetRes (=use of net reserves) is the overall balance, with a minus sign; over this period, it is composed almost exclusively of the reduction in net foreign exchange reserves of the monetary authority. The following balance of payments identity holds: TDGSI=NT+NKI+ErrOm+Use of NetRes. Net ODA is net official development assistance, from the OECD's DAC data online. Debt ratios (panel 4) are from World Bank, *World Development Indicators* online.

trade deficit in goods, services, and income, along with its financing. We construct a broad measure of net transfers from abroad, NT, by combining official transfers with capital grants and net worker remittances; this variable is larger than private capital flows and large enough in some years to cover the entire deficit. Net private capital inflows are also substantial, however; they reach a trough in 2002 and then rise sharply until 2007, consistent with our discussion above. Note that the appropriate classification of remittances is unclear here: they may well have some of the characteristics of a financial flow, including responsiveness to perceived investment returns.

Panel 3 shows the composition of net capital inflows, and leaves us with a puzzle. Short-term non-equity flows are by far the dominant form of financ-

ing, and in fact long-term debt flows show net repayment over most of the period. The balance of payments data therefore suggest that the average maturity of Kenya's external liabilities has shortened considerably over the past decade, a worrying trend from the perspective of exposure to sudden stops. But, as shown in panel 4, Kenya's official external debt situation is in fact highly favourable, both with respect to maturity structure and according to standard measures of debt burden (see also Republic of Kenya, 2009). As of late 2007, moreover, international reserves were well above the 1:1 ratio to short-term external debt that is now regarded as a minimally prudent rule of thumb for emerging market countries.[7] An important question from a monetary policy perspective, therefore, is whether the short-maturity obligations implied by the balance of payments (panel 3) present a risk of reversal that could be activated by a change in relative yields, business expectations, or political conditions in Kenya. The nature of these claims – including their origin and currency of denomination – is the subject of an ongoing study by the Kenya National Bureau of Statistics and the CBK. We take an indirect approach to these questions in the following section.

8.2.4 Capital flows, exchange rates, and monetary policy in Kenya

The volume and maturity structure of private flows suggests a relatively modest level of rollover risk, but there are numerous conduits for portfolio substitution including the dollarization of domestic bank liabilities, the circulation of foreign currency in the tourist and informal economies, and the accumulation of offshore deposits by Kenyan residents. Rather than focus on the size and composition of annual flows, we look in this section for the imprint of capital mobility on monthly interest rates and exchange rates. Following a brief review of exchange rate policy in Kenya, we begin with the most conventional approach, examining the evidence for an uncovered interest parity relationship between short-term interest rates in Kenya and the world capital market. We then construct a measure of exchange market pressures that combines exchange rate movements with changes in international reserves, in order to accommodate variations over time in how the CBK has responded to balance of payments pressures. An analysis of the time pattern of exchange market pressures suggests that national elections have been an important source of balance of payments volatility in the past, perhaps reflecting uncertainties in the electoral process and working through remittance flows as well as through capital account transactions. We study the two-way relationship between our exchange market pressure variable and domestic interest rates, showing that each affects the other, as expected in a world in which market participants respond to interest rate differentials and the monetary authority must take cognizance of the capital account in setting domestic interest rates. Finally, we use the September 2008 demise of Lehman Brothers, widely viewed

as the event that converted a global recession into a global financial crisis, to shed light on the determinants of *ex ante* vulnerability of the capital account to external shocks.

EXCHANGE RATE POLICY

Table 8.1 documents key transitions in Kenya's exchange rate regime. Focusing on the most recent period, the IMF classifies Kenya as operating an independent float between 1992 and 1997 and a managed float since 1998. Reinhart and Rogoff (2004) note that developing country central banks tend to pursue exchange rate targets with considerably more determination than their official pronouncements suggest – so that a managed floater might in fact be operating a fixed exchange rate or a crawling peg for extended periods. Their *de facto* empirical classification, based on observed exchange rate movements and updated to 2007, characterizes the Kenyan regime as a crawling band with margins of ±2 per cent or smaller.

Figure 8.4 shows the basis for this view. Following Eichengreen *et al.* (1994), we calculate a monthly measure of exchange market pressures – denoted EMP – by adding the percentage loss in reserves during the month to the percentage depreciation of the shilling:

$$EMP = 100 \cdot \left(\frac{E_t - E_{t-1}}{E_{t-1}} \right) + 100 \cdot \left(\frac{R_{t-1} - R_t}{R_{t-1}} \right) \tag{8.1}$$

Here, E_t is the nominal exchange rate in Kenya shillings (Ksh) per US dollar, and R_t is the dollar value of total international reserves (excluding gold, which is virtually never used for exchange rate management). This measure is robust to differences in a country's allegiance to any particular target path for the nominal exchange rate. A favourable shock to the balance of payments, for example, will induce reserve accumulation when the exchange rate is heavily managed, and exchange rate appreciation when the exchange rate is allowed to float freely; in both cases, the reduction in exchange market pressures produces a decline in EMP.

Figure 8.4 shows the two components of EMP along with a smoothed version of EMP itself, for the period of an open capital account. Consistent with a *de facto* narrow band, exchange rate movements are generally small and tend to be accompanied by reserve losses that are larger in magnitude and in the same direction. This evidence of active pursuit of exchange rate targets is not definitive, however, because balance of payments conditions were favourable over most of the period, and reserve accumulation was desirable on prudential grounds in the wake of the 1993 balance of payments crisis and subsequent global events (including the Asian financial crisis). Moreover, the external sit-

Table 8.1 Transitions in Kenya's exchange rate regime, 1966–2009

Year	Ndung'u *et al.*	Exchange rate regime		Exchange controls (M&N 2001)
		IMF *de jure* classification	RRI *de facto* classification	
1966	Peg to UK pound; switch to US$ in 1971	Peg	Pre-announced peg	
1970				Administrative controls tightened (1970/1)
1975	Peg to IMF Special Drawing Rights (SDR)			
1982	Crawling peg to trade-weighted basket			
1987			Managed floating	
1991	Market-determined rate[b]			FEBCs introduced[a]
1992		Independently floating	Freely falling	Export retention scheme introduced
1993	Float (official rate merged with interbank rate)			All exchange control regulations suspended
1994			Managed floating	Article VIII status
1995	–			Foreign Exchange Control Act repealed
1996			*De facto* crawling band that is narrower than or equal to ±2%	
1998		Managed floating		
2009				

Cells show regimes starting in the year they were introduced.
a FEBCs are Foreign Exchange Bearer Certificates of Deposit; see Ariyoshi *et al.* (2000).
b Ndung'u (2000) characterizes the exchange rate regime from 1990 to 1992 as a dual system characterized by an official rate and a market-determined interbank rate.
Source: M&N (2001) refers to Mwega and Ndung'u (2001). 'Ndung'u *et al.*' refers to M&N (2001) and Ndung'u (2000). RRI refers to the Reinhart and Rogoff (2004) classification, as updated by Reinhart and Ilzetski (http://terpconnect.umd.edu/~creinhar/Papers.html); this is an empirically driven classification based mainly on observed exchange rate movements; Reinhart and Rogoff (2004) had previously characterized Kenya's regime as managed floating from 1994 to 2001. The IMF classification is as recorded by RRI.

uation reverses itself sharply in 2008, in the face of global food and fuel price shocks and in the midst of post-election violence. During this episode, the balance of payments adjustment is more evenly shared between reserve losses and exchange rate depreciation. On balance, the evidence suggests that, during periods of relative quiescence in foreign exchange markets, the CBK can smooth out exchange rate volatility with relatively modest fluctuations in its intervention. During periods of greater pressure, the CBK has been prepared to allocate a more substantial burden to exchange rate movements.
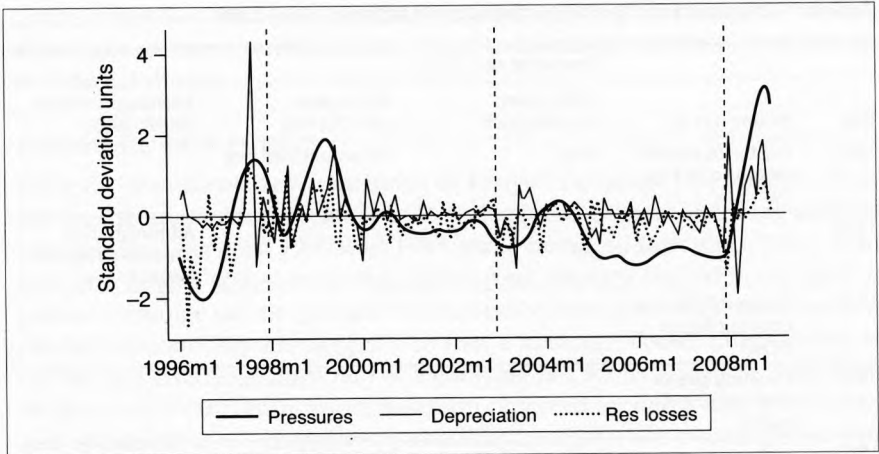
Figure 8.4 Exchange market pressures, 1996–2008.
Pressures=EMP (smoothed). Vertical lines show presidential and parliamentary elections.
Source: CBK.

UNCOVERED INTEREST PARITY

When capital movements are perfectly free and investors can diversify away exchange risk, a version of the 'law of one price' should hold for debt securities: the expected return on claims of similar maturity, liquidity, and default risk should be the same when measured in a common currency. This benchmark is known as *uncovered interest parity* (UIP). As the expected yield on a dollar-denominated three-month US Treasury bill, when measured in Kenya shillings, is approximately the interest rate on that security plus the rate of expected deprecation of the shilling against the US dollar during the three-month holding period, the UIP condition can be stated as:

$$i_t = i_t^* + Expected \ Ksh \ / \ \$ \ depreciation \ from \ t \ to \ t + 3 \qquad (8.2)$$

where i_t and i_t^* are the Kenyan and US interest rates. Under UIP, the trilemma is in full force: the country can either choose the path of its interest rate (e.g. on domestic policy grounds) by letting its exchange rate float freely, or choose the path of its exchange rate and leave its interest rate to be determined by international arbitrage. It cannot act independently on the two variables, for example by raising interest rates in order to keep inflation low while simultaneously using foreign exchange intervention to avoid an appreciating exchange rate.

Cross-country deviations from interest parity reflect imperfect capital mobility. These can in principle go in either direction; effective controls on outward capital movements, for example, may support a captive market for domestic bonds in a low-income country even when the interest rate they pay is

below the uncovered yield on similar foreign bonds.[8] If controls are absent or ineffective, however, an emerging market interest rate would be expected to exceed a similar uncovered industrial country yield by a 'risk premium' that reflects the less attractive liquidity, default risk, or other characteristics of the emerging market instrument:

$$i_t = i_t^* + Expected\ Ksh\ /\ \$\ depreciation\ from\ t\ to\ t+3$$

$$+ Risk\ premium \tag{8.3}$$

Table 8.2 shows uncovered interest parity deviations – estimates of the risk premium – on three-month Treasury bills in Kenya and a set of comparator economies, using US Treasury bills as the foreign asset. We employ two alternative measures of exchange rate expectations. One is the *ex post* rate of depreciation itself. The assumption here is that market participants base their behaviour on an unbiased forecast of upcoming depreciation. As the forecast is unbiased, the *ex post* rate equals the forecast plus a forecast error that has an expected value of zero at the time the forecast is made. By construction, therefore, the average *ex post* yield equals the average yield expected by market participants, and the difference between this and the home interest rate is the average risk premium. As an alternative, we use a simple backward-looking rule of thumb, whereby market participants assume that annualized depreciation over the next three months will be the same as the observed rate of depreciation over the previous year.

Kenya's premium is the highest of the comparison group – close to 400 basis points when *ex post* depreciation is used and well over 500 basis points

Table 8.2 Uncovered interest parity deviations

Country	Unbiased forecasts (%)			Static forecasts (%)		
	No. of obs.	Mean	Std dev.	No. of obs.	Mean	Std dev.
Uganda	156	–0.60	20.09	144	1.60	9.83
Tanzania	159	–2.07	16.20	147	–0.93	7.16
Ghana	146	1.94	42.43	134	1.88	27.59
Kenya	156	3.71	23.58	144	5.37	8.43
Vietnam	133	0.23	6.94	133	–0.02	3.78
Philippines	144	–2.01	26.86	132	–2.02	13.14
Thailand	98	2.16	12.20	99	1.79	7.20
South Africa	159	–5.70	44.65	147	–0.51	18.42
Mexico	159	3.15	28.00	148	4.24	8.45

In the 'unbiased forecasts' columns, expected depreciation equals actual *ex post* depreciation over the three-month holding period of the bond (*t* to *t*+3). In the 'static forecasts' columns, expected depreciation is the observed rate of depreciation between months *t* and *t*–12.

using the rule-of-thumb forecast. Although this may in part reflect strong prudential limitations on inward investment, it may also reflect concerns about political stability, or other sources of reluctance by foreign investors – including, possibly, expectations of currency depreciation that have not materialized over the course of the sample.

Although the size of the risk premium has implications for Kenya's debt burden and also for the domestic cost of capital, the implications of portfolio behaviour for monetary policy depend less on the size of the risk premium than on the time period over which monetary policy can influence the premium. If the markets demand a non-zero but constant premium from month to month, then in practice the trilemma is at work: movements away from the average premium will tend to be brief, and the scope for influencing the interest rate and exchange rate separately will be limited. How tightly, then, are domestic interest rates tied to changes in the foreign uncovered yield? In Table 8.3, we report a set of bivariate regressions using our two proxies. The dependent variable is the domestic interest rate. The explanatory variable is the sum of the US interest rate and expected depreciation, using our rule-of-thumb depreciation in the upper panel and observed *ex post* depreciation in the lower panel. In the latter case, forecast errors generate a simultaneity bias even if market forecasts are unbiased; to handle this, we employ four lags of the independent variable, dated periods t–3 to t–6, as instruments. Under the hypothesis of uncovered interest parity, the coefficient on the uncovered yield in these regressions should be 1 and the constant should be zero.

At the bottom of each panel in Table 8.3, we show an approximate 95% confidence interval for the coefficient on the uncovered yield. The empirical record of UIP is weak even among industrial and emerging market countries (Flood and Rose, 2002), and our results are consistent with this: in no case does the confidence interval include 1. In most cases, however, the confidence interval also excludes zero, allowing us to reject the hypothesis that domestic interest rates are unrelated to the uncovered US yield.

The upper panel performs significantly better statistically, and in some cases the differences are sharp. Kenya's is one of these – in the upper panel, the Kenyan T-bill rate seems strongly tied to the foreign uncovered yield, suggesting that capital movements are sensitive to relative yields and that exchange rate developments may influence interest rates through an expectations channel. In the lower panel, however – where the maintained assumption is that exchange rate expectations are fully forward-looking – there is little evidence that private capital movements exert a constraint on monetary policy; we cannot reject the possibility that the coefficient is zero. In the next subsection, we develop some further evidence on the policy environment by examining the bivariate relationship between Kenyan interest rates and exchange market pressures.

Table 8.3 Interest parity regressions

Variable	UGA	TZA	GHA	KEN	VNM	PHL	THA	ZAF	MEX
Panel 1: OLS regressions on backward-looking expected yields									
UNCYLD	0.079***	0.099**	0.210***	0.343***	0.348***	0.184***	−0.021	0.048***	0.350***
	2.71	2.38	8.12	6.20	11.09	16.58	−1.57	3.68	3.42
Constant	9.039***	8.030***	20.627***	8.920***	4.600***	6.382***	2.583***	10.103***	9.187***
	31.79	17.57	20.5	16.86	13.49	27.61	21.42	40.29	14.82
N	144	147	134	144	133	132	99	147	148
R²	0.043	0.034	0.333	0.222	0.355	0.637	0.017	0.086	0.193
RMSE	3.701	3.609	9.725	5.922	2.213	2.221	1.152	2.994	6.282
95% confidence interval:									
Lower	0.019	0.019	0.150	0.223	0.288	0.164	−0.041	0.028	0.150
Upper	0.139	0.179	0.270	0.463	0.408	0.204	−0.001	0.068	0.550
Panel 2: Instrumental variables regressions on *ex post* yields									
UNCYLD	0.112	−0.150	0.145***	−0.420	0.501***	0.201**	−0.010	−0.055	−0.062
	1.02	−1.50	4.05	−1.54	3.06	1.99	−0.34	−0.93	−0.62
Constant	8.629***	10.802***	22.728***	14.692***	3.635***	6.258***	2.587***	11.673***	13.151***
	7.26	9.49	17.49	6.57	3.7	6.68	22.63	11.73	10.14
N	150	153	140	150	133	138	98	153	153
RMSE	4.352	3.871	12.45	12.09	3.802	5.586	1.139	3.995	7.582
95% confidence interval:									
Lower	−0.108	−0.350	0.065	-0.960	0.181	0.001	−0.070	−0.175	−0.262
Upper	0.332	0.050	0.225	0.121	0.821	0.401	0.051	0.065	0.138

The table shows estimated coefficients and robust t-statistics (***denotes significance at the 1% level, **at the 5% level). In panel 1, the uncovered yield (UNCYLD) is the annualized interest rate on US three-month Treasury bills in month t plus the percentage depreciation of the average Ksh/$ exchange rate between month t and month t–12. In panel 2, the interest rate is the same, but we use the annualized *ex post* depreciation between months t and t+3. As a proxy for expected depreciation, the *ex post* value is subject to a measurement error (the forecast error) that is correlated with the proxy and therefore a source of simultaneity bias. As instruments, we use annualized depreciation in months t–3, t–4, t–5, and t–6. If forecasts are conditionally unbiased, these are valid instruments because they are in the market's information set at the time forecasts are made. The 95% confidence intervals for the coefficient on UNCYLD are approximate: the table shows the estimated coefficient minus and plus 2 standard errors. RMSE denotes root mean squared error.

INTEREST RATES AND EXCHANGE MARKET PRESSURES

When capital mobility is appreciable and the monetary authority seeks to avoid excessive volatility in the exchange rate and/or international reserves, we expect to see a two-way relationship between exchange market pressures and domestic short-term interest rates. On the one hand, monetary policy actions, to the degree that they operate directly or indirectly through short-term domestic interest rates, should provoke a portfolio response that manifests itself as a change in exchange market pressures. On the other hand, we should see monetary policy instruments, again reflected directly or indirectly in short-term interest rates, responding to exogenous changes in exchange market pressure with a view to moderating the impact on the exchange rate and/or reserves. The latter relationship underlies the 'interest rate defence' of a currency facing speculative outflows.

In this section, we estimate reduced form dynamic models to characterize the relationship between Kenyan interest rates and exchange market pressures, conditional on foreign interest rates. These bivariate vector autoregressions (VARs) take the form:

$$x_t = \Sigma_{j=1}^k A_j x_{t-j} + \Sigma_{j=0}^k C_j i_{t-j}^* + \varepsilon_t, \tag{8.4}$$

where x_t is a 2×1 vector composed of the Kenyan interest rate and EMP, A_j (2×2) and C_j (2×1) are matrices of reduced form coefficients, and ε_t is a 2×1 vector of shocks or 'innovations' to the dependent variables. We are interested, first, in patterns of causality between the two variables, which we assess using tests of Granger causality. These tests ask whether lagged values of the Kenyan interest rate add predictive power to lagged values of EMP in forecasting future EMP – in this case, the Kenyan interest rate is said to 'cause' EMP – and similarly for lagged values of EMP in forecasting future interest rates. We then use the estimated equations to trace out the time path of how each variable responds over time to an unexpected one-time change or 'innovation' in the other. Under the assumption that the innovations correspond to shocks to monetary policy and the balance of payments, respectively, these impulse responses indicate the direction, magnitude, and persistence of influences from monetary policy shocks to the balance of payments – given the high frequency of our data, most probably through portfolio effects – and from balance of payments shocks to monetary policy.

We estimate two separate VARs, involving in turn the three-month T-bill rate and the repo rate in Kenya. We estimate with twelve monthly lags, and in each case we include the relevant US interest rate – the three-month T-bill rate, and the Federal Funds rate respectively – as an exogenous variable in the VAR.
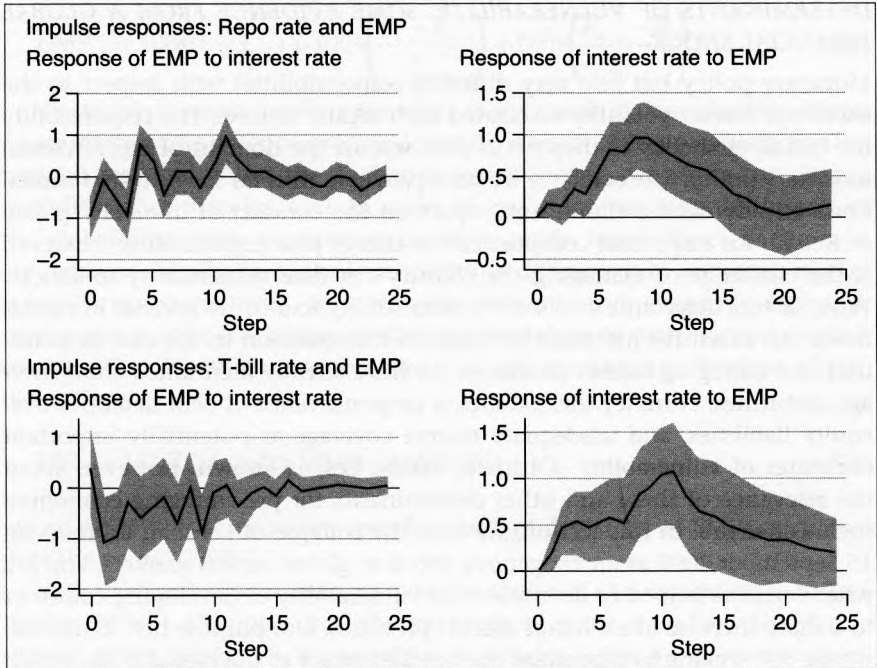
Figure 8.5 Impulse responses: interest rates and exchange market pressures in Kenya.
The figures show responses to a shock equal to one standard deviation of the relevant innovation; steps are in months. Upper and lower bounds show the estimated effect plus and minus two standard deviations. The underlying bivariate VARs have twelve monthly lags and include as exogenous variables a set of centred monthly dummy variables and the current value and twelve lags of the relevant US interest rate (the Federal Funds rate in the repo case and the three-month T-bill rate in the T-bill case). We assume in both cases that the interest rate innovation is causally prior to the EMP innovation, so that innovations in the domestic interest rate affect EMP in the month they occur, whereas the interest rates respond to EMP only with a one-month lag (the qualitative results are not sensitive to the choice of ordering).

In both cases, the causality evidence is very strongly consistent with a two-way relationship between the interest rate and exchange market pressures. We reject the hypothesis of no Granger causality from the interest rate to EMP, and also from EMP to the interest rate, and in both cases the significance level is well below 1 per cent. Figure 8.5 shows the impulse responses, using the repo rate in the upper panel and the T-bill rate in the lower. These indicate a statistically significant short-run response of each variable to the other. The direction of these responses is consistent, on the one hand, with a conventional portfolio response to changes in domestic monetary policy: a monetary tightening produces a short-run reduction in exchange market pressures. In the other direction, the impact of exchange market pressures on the interest rate is consistent with a monetary policy that seeks to reduce exchange rate volatility by responding to shocks to the balance of payments. The second of these effects is stronger and more persistent, and is estimated more precisely.[9]

DETERMINANTS OF VULNERABILITY: SOME EVIDENCE FROM A GLOBAL FINANCIAL SHOCK

Monetary policy has two very different responsibilities with respect to the exchange market volatility associated with capital inflows. The responsibility for handling shocks as they occur falls within the domain of conventional monetary policy. The evidence we have provided thus far suggests that capital flows already exert a significant impact on the conduct of monetary policy in Kenya. An important complement to this *ex post* responsibility, however, is the challenge of managing the country's *ex ante* vulnerability to shocks. What factors determine a country's vulnerability to a costly reversal in capital flows? An extensive literature investigates this question in the case of industrial and emerging market countries: we have already mentioned short average maturities, currency mismatches, a preponderance of debt liabilities over equity liabilities, and inadequate reserve coverage as potentially important correlates of vulnerability (Obstfeld, 2008). Less is known, however, about the relevance of these and other determinants for pre-emerging economies such as Kenya's. In this section, we treat the collapse of Lehman Brothers on 15 September 2008 as an exogenous shock to global capital markets, and ask what variables helped to determine the vulnerability of developing countries to a sharp increase in exchange market pressures. Our purpose here is narrow; we are not seeking to determine the overall impact of the global crisis, which emerged over a longer period and, within Africa, primarily via export markets. We are instead exploiting the unanticipated and dramatic nature of the Lehman Brothers collapse to isolate asset market pressures on the exchange rate and infer the sources of vulnerability to such pressures.

Rose and Spiegel (2009) find that most of the variables suggested by the literature have little or no success in predicting which countries were hit hard, and which were not, by the global financial crisis. Our exercise differs from that of Rose and Spiegel in some important ways, however, most notably in focusing on a well-defined and limited aspect of the crisis – its immediate short-run impact on the foreign exchange market (Rose and Spiegel construct a 'crisis' variable that combines changes over the course of 2008 in real GDP, the stock market, country credit ratings, and exchange rates). Reflecting our focus on emerging and pre-emerging economies, moreover, our sample excludes the industrial countries altogether and includes all of the non-industrial countries for which data are available. Nonetheless, the Rose and Spiegel results suggest that modest expectations are appropriate in this exercise, which we view as an exploratory first cut.

To construct our dependent variable, we make three important changes to EMP. First, consistent with our earlier results for Kenya, we expand the definition of exchange market pressure to include the change in the domestic discount rate, i_i:

$$\text{EMP}^+ = 100 \bullet (i_t - i_{t-1}) + 100 \bullet \left(\frac{E_t - E_{t-1}}{E_{t-1}} \right) + 100 \bullet \left(\frac{R_{t-1} - R_t}{R_{t-1}} \right) \tag{8.5}$$

We do this to avoid masking the effect of the shock in countries that adopted an interest rate defence, raising domestic rates in order to contain the impact on reserves and/or the exchange rate.[10] Second, we study the change in EMP$^+$ rather than its level, in order to avoid confounding the impact of the global crisis with pre-existing country-specific trends in exchange market pressure. Finally, to control for structural differences in exchange market volatility across countries, we normalize each country's change in exchange market pressure by the historical standard deviation of such changes for that country. Our dependent variable, denoted LBE for 'Lehman Brothers effect', is therefore:

$$\text{LBE}_i = \Delta \text{EMP}_i^+ (\text{October } 2008) / \sigma_i (\Delta \text{EMP}^+) \tag{8.6}$$

where $\sigma_i(\text{EMP}^+)$ is the country-specific standard deviation of EMP$^+$ calculated over the period 2000–07.

Note that we focus on changes over the course of October rather than September 2008.[11] Although the Lehman Brothers event is widely viewed as a turning point, this is with the benefit of hindsight. Figure 8.6 shows the distribution of exchange market pressures among emerging market countries, and shows that the global recession became a global crisis only in October. Our regressions seek to uncover the determinants of this shift at the country level.

To avoid reverse causality, we restrict attention to initial conditions that were established by or before 2007. We therefore run a set of cross-sectional regressions of the form:

$$\text{LBE}_i = \alpha + \beta \bullet x_i (2007) + \gamma' \text{controls}_i (2007) + \varepsilon_i \tag{8.7}$$

where x_i is a variable suggested by the literature as a measure of *ex ante* vulnerability. All regressions include the log of real GDP per capita, to control for level of development, and the log of population, to control for country size. Table 8.4 reports the estimated values of β along with robust t-statistics.

Table 8.4 tentatively confirms the potential relevance of a number of the vulnerability measures suggested in the literature. The ratios of M2 and short-term external debt to international reserves are alternative measures of implicit claims on the central bank's liquid reserves. Higher values of these in 2007 predict the Lehman Brothers effect at a significance level of 10 per cent or better. The capital-to-asset ratio of banks in 2007, and an indicator of the rate of expansion of bank balance sheets between 2005 and 2007 (the increase in the domestic credit to GDP ratio) also predict balance of payments pressure at close to conventional levels of significance. The Kraay–Nehru debt distress
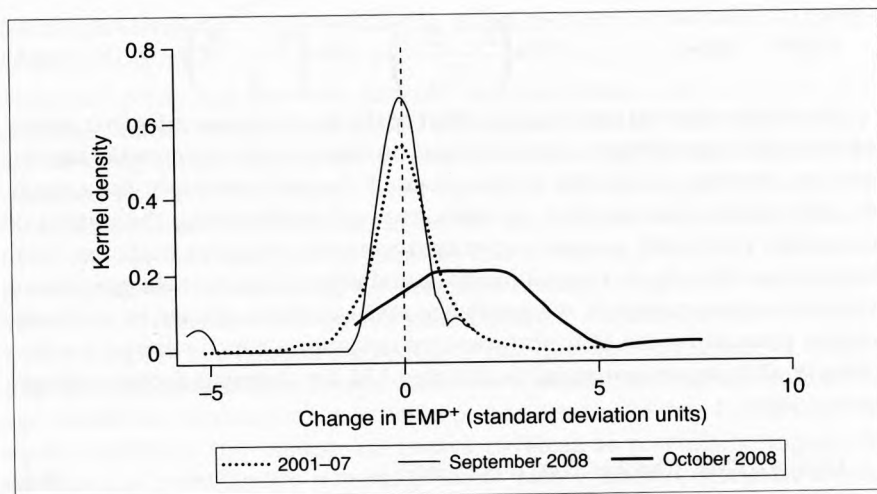
Figure 8.6 Lehman Brothers and the global distribution of EMP+, non-industrial countries.
The kernel densities are smoothed histograms of the cross-country data for twenty-one emerging market countries.

indicator is particularly relevant for the pre-emerging countries in the sample. It defines a distress episode as one during which the country had substantial arrears on external debt, received debt relief from the Paris Club group of bilateral creditors, or received substantial balance of payments support from the IMF.[12] This variable is available only to 2002, and as a predictor we use the proportion of years between 1990 and 2002 classified as distressed. In principle, this variable operates both as a predictor of continuing exposure to debt distress and as a proxy for adverse reputational effects from earlier episodes. Higher values were associated with larger exchange market pressures. Finally, the size of net capital inflows immediately preceding the crisis – captured by the current account deficit – carries a positive point estimate, but not a significant one at conventional levels. Results for the two control variables are of varying statistical significance but consistently positive in sign; they suggest that richer and larger countries tended if anything to be harder hit, consistent perhaps with their more sophisticated financial systems.[13]

A number of variables identified as potentially relevant in the literature did not prove significant in predicting EMP+. These include measures of real exchange rate overvaluation; World Bank assessments of the quality of economic policy; ratios of bank liquid reserves to assets; non-performing loans; and the ratios of debt and debt service to exports or GDP. The Chinn and Ito capital account openness indicator enters with a positive but statistically insignificant coefficient.

Table 8.4 Determinants of the Lehman Brothers effect

Dependent variable: September 2008–October 2008 change in normalized EMP$^+$ calculated using US$ exchange rates

		Individual OLS regressions on x_i variables:						
Result	Control variables only	Ratio of M2 to international reserves 2005–07	Ratio of short-term external debt to international reserves 2007	Share of short-term debt in total external debt 2007	Increase in domestic credit as share of GDP 2007	Commercial banks' capital/ asset ratio 2007	Average value of Kraay–Nehru (2006) debt distress indicator 2007	Current account deficit 1990–2002
log(y per capita)	0.3399	0.2794	0.0848	0.0286	0.3876	0.4209	0.2046	0.4137
robust *t*-stat	2.24	1.90	0.61	0.15	2.39	1.51	1.40	2.25
P value	0.03	0.06	0.55	0.88	0.02	0.14	0.17	0.03
log(population)	0.112	0.2003	0.1798	0.0778	0.1273	0.1201	0.0646	0.1639
robust *t*-stat	1.24	2.56	3.20	0.86	1.65	0.81	0.66	1.80
P value	0.22	0.01	0.00	0.39	0.10	0.42	0.51	0.08
Coefficient on x_i	–	0.2135	0.0035	0.0336	–0.0246	–0.1342	0.0177	–0.0146
robust *t*-stat	–	1.66	19.02	1.27	–1.51	–1.60	1.72	–1.34
P value	–	0.10	0.00	0.21	0.14	0.12	0.09	0.19
N	68	67	57	57	67	38	60	62
R²	0.0765	0.1962	0.4126	0.1392	0.1215	0.1196	0.1756	0.0870
RMSE	1.403	1.329	1.097	1.328	1.390	1.329	1.275	1.433
Standardized Kenya residual	0.2136	0.0326	0.0371	0.1393	0.1804	0.5786	–0.4620	0.2648

Sample sizes are determined by data availability, and industrial countries are excluded. For Kenya, we use the repo rate as a discount rate is not available. The standardized Kenya residual is Kenya's residual divided by the RMSE of the regression. The domestic credit variable is the increase in the percentage ratio of total commercial banks' domestic credit to GDP between 2005 and 2007. The Kraay–Nehru variable is the proportion of years from 1990 to 2002 when the country was classified as debt distressed by Kraay and Nehru (2006). Real GDP per capita is in constant international dollars. All variables except the Kraay–Nehru indicator are from World Bank, *World Development Indicators* online. RMSE denotes root mean squared error.

8.2.5 Summarizing

Vision 2030 anticipates a substantial contribution from foreign capital inflows. The period from 2003 to 2007 illustrates the favourable interactions that are central to sustaining such a strategy: domestic reforms supported a combination of inflows and rising investment; strong growth in exports and GDP produced stable or improving creditworthiness despite a buildup of foreign liabilities; and the central bank was able to pursue price stability while limiting the short-run volatility of the exchange rate. The global financial crisis, however, illustrates the urgency of some of the concerns we have raised in this section. First, the composition of Kenya's external liabilities is an important determinant of the country's exposure to macroeconomic instability from sudden reversals. Given ongoing uncertainties in international financial markets and in the domestic political realm, it is a priority that the facts in this area be better established. Second, *Vision 2030* anticipates a central role for foreign direct investment (FDI), both in the infrastructure area and in supporting export diversification. In the absence of direct restrictions on FDI, aspects of the overall investment environment are the most crucial determinants of the rate of inward investment.[14] We have nonetheless noted that, although the reforms of the mid-1990s removed direct restrictions on FDI, the impact of lingering controls on financial transactions by non-residents may be substantial. In contrast with controls on short-term international borrowing, which are largely absent, these do not have an obvious prudential justification. Adequate justification may of course lie elsewhere, but on macroeconomic grounds, the balance between these two types of control should perhaps be revisited. Third, the cross-country evidence emphasizes the overriding importance of domestic saving, even in a world of high capital mobility; we return to this point below. Finally, the degree of capital mobility has an important effect on the environment for monetary policy. We have taken a variety of approaches to assessing the relevance of the trilemma in Kenya, recognizing that balance of payments flows are difficult to measure and classify with precision. Our results suggest that short-run capital mobility is imperfect but substantial in Kenya; we believe it is likely to be even greater in the years ahead. This places a premium on central bank activities that lie outside of conventional stabilization policy, including effective prudential oversight of the banking system and regular assessment of the capital controls regime.

8.3 Supporting external competitiveness

Central banks worldwide have placed increasing emphasis over the past two decades on the objective of price stability. In theory, at least, this is not a choice of stability over development. Instead, it reflects an intellectual consen-

sus that monetary policy makes its best contribution to long-run development by maintaining relatively low inflation and a strong financial system. As outlined in Chapter 7, this consensus favours a system of 'constrained discretion' in which the pursuit of short-run goals by the central bank is subordinated to the maintenance of an anchor for private sector expectations of inflation. According to this consensus, market participants must understand that, when conflicts arise between price stability and competing 'real' objectives – including low public sector borrowing costs, high employment, or a competitive real exchange rate – the central bank will give first priority to price stability. These principles are strongly reflected in a succession of Central Bank Acts in Kenya, dating from 1996, and also in the *Vision 2030* documents with their prominent emphasis on macroeconomic stability.

We saw in Section 8.2 that, although private capital mobility is considerable in Kenya, the CBK is not yet in the throes of the trilemma. A combination of imperfect asset substitutability, prudential regulations, and residual capital controls appears to give the CBK scope to target inflation while also exerting some influence over the path of the nominal exchange rate. As domestic wages and prices move more slowly than the exchange rate in the absence of intervention, the CBK has a handle – certainly in the short run and perhaps for extended periods – not just over the nominal but over the *real exchange rate*, defined here as the domestic relative price of non-traded to traded goods.[15] Calvo *et al.* (1995) characterize the real exchange rate as 'probably the most popular real target [of monetary policy] in developing countries' (p. 98).[16] They also warn, however, that targeting the real exchange rate typically comes at a cost in terms of other objectives. How aggressively should the CBK pursue real exchange rate targets?

8.3.1 Reducing volatility

It is important to distinguish two types of exchange rate objective. The first – and less controversial – is limiting extreme short-run appreciations or depreciations. In thin markets, these can be driven by large temporary shocks to the current or capital account. As capital mobility rises, however, the capital account looms larger: herd behaviour may amplify the response to news of any kind, and exchange rates may overshoot when adjusting to changes in monetary policy whether at home or abroad.

There are good reasons to intervene to limit short-run volatility. These include avoiding excessive instability in aggregate demand, especially when banks or other domestic residents may have open positions in foreign exchange (Obstfeld, 2008); avoiding severe liquidity problems for firms when credit markets are weak and costs and revenues are on different sides of the traded/non-traded divide (e.g. for exporters of labour-intensive goods or services); and limiting exchange rate risks when foreign exchange markets are thin and instruments for hedging these risks are absent. The last two consid-

erations are particularly relevant when domestic financial markets are poorly developed. This may help to explain our earlier observation that central banks in emerging market and low-income countries routinely intervene to limit exchange rate volatility, even when the official stance of policy is that the exchange rate is floating (Calvo and Reinhart, 2002). We have seen evidence of this phenomenon in Kenya throughout this chapter, including the *de facto* classification of Reinhart and Rogoff (Table 8.1), which suggests a narrow crawling band rather than the official stance of a managed float.[17]

Of course, any volatility reduction strategy faces the practical problem of deciding when to intervene and for how long. Capital mobility makes this more difficult, because on top of the difficulty of distinguishing transitory from permanent shocks, the central bank must contend with private sector expectations about the onset and abandonment of intervention. Too great an allegiance to any predetermined path for the exchange rate risks activating the trilemma. When pressures push the currency to the weak side of the central bank's notional band, a targeting policy can produce a currency crisis. The key issue from the viewpoint of the monetary framework, as emphasized in Chapter 7, is that, when conflicts arise between the provision of a nominal anchor and exchange rate objectives, the nominal anchor comes first.

Particularly in low-income countries, central banks with flexible exchange rates also face a tension at the level of policy design, in determining the degree of volatility they are prepared to tolerate. We emphasized above that the welfare benefits of reducing volatility may be greatest when domestic financial markets are weak. Consistent with this, Aghion *et al.* (2006) find that the impact of real exchange rate volatility on economy-wide productivity growth is essentially zero for countries with highly developed financial markets, but negative and statistically significant for countries at low levels of financial development.[18] The gains from limiting volatility may therefore be strong, particularly for activities that the government finds it difficult to support via other means, including non-traditional exporters and/or small to medium-sized enterprises who lack access to existing financial markets. But a reduction in exchange rate volatility also undermines the incentive for private agents to develop the financial markets and instruments for managing that volatility.[19] The short-run benefit may therefore come at the cost of a less vibrant and growth-oriented financial sector. The appropriate balance is a matter of judgement, and in any case exchange rate policy should be complemented with direct efforts to foster the development of efficient and well-regulated financial markets.

8.3.2 Real exchange rate trends

Our main focus, however, is on strategies that target an undervalued real exchange rate. In an appendix,[20] we develop a simplified version of the workhorse non-traded goods/traded goods model to illustrate the influence of the

real exchange rate on export competitiveness. A real appreciation increases the profitability of firms producing for the domestic market, drawing labour and other mobile resources out of the production of exports. If the export sector is already too small from the perspective of long-run growth, real appreciation worsens this distortion and creates potentially serious welfare losses (Rodrik, 2008). Any impact on the investment environment for exports compounds these losses over time.

Real exchange rate targets are an active source of discussion in Kenya, where export performance has improved since 2002 but continues to fall short of the ambitions of *Vision 2030*. Pollin and Heintz (2007) have recently called for a reassessment of monetary policy with a view to achieving a more depreciated shilling. The underlying argument is that the sectors favoured by real depreciation – those that produce either directly (exports) or indirectly (import substitutes) for the world market – include some that are 'special' from a development perspective, due to the quantity and quality of jobs they create and, perhaps especially, the productivity spillovers they deliver to the rest of the economy. These sectors are suboptimally small, it is argued, in the absence of a real exchange rate policy: their expansion, even at the cost of other activities, would generate economy-wide gains.

The 'principle of policy assignment' states that the best approach to a market failure is generally to attack the problem at its source. Examples include removing the labour market rigidities that generate underemployment, and directly subsidizing industrial activities that generate learning-by-doing. The argument for a weak real exchange rate is therefore what economists call second best: its validity is context specific and depends not just on the presence of a market failure but on the absence of a viable first-best policy approach. Hausmann and Rodrik (2003) interpret an undervalued currency as a second-best form of industrial policy, for countries with relatively weak government institutions and with potential comparative advantage in manufactured exports. The argument is that the manufacturing sector is a source of productivity spillovers that are external to the firm and therefore subject to market failure. The 'first-best' or optimal policy is to subsidize exports directly, and particularly non-traditional exports; but this requires both ample fiscal resources and institutions that are capable of combining subsidies with strong pressures to succeed. A weak but unified exchange rate, they argue, delivers incentives for export diversification without promoting rent-seeking or requiring an unrealistic degree of public sector capability for industrial policy.

Panel 1 of Figure 8.7 suggests the locus of concerns over exchange rate competitiveness in Kenya. We show three concepts of the real exchange rate. The most commonly used is the multilateral real effective exchange rate (REER), calculated as a trade-weighted average of bilateral external real exchange rates with Kenya's main trading partners (of which the USA and the Euro zone are
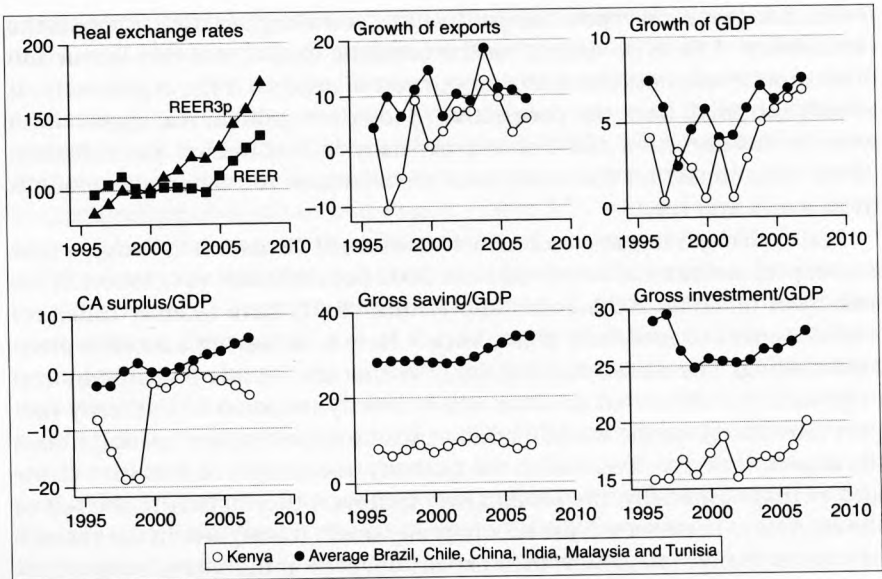
Figure 8.7 Kenya and third-party exporters.
Panel 1: REER is the CBK's trade-weighted real exchange rate, built up from country-level real exchange rates of the form $r_i = CPI_{KENYA}/(E_i \cdot CPI_i)$, where E_i is the bilateral nominal exchange rate in Ksh per unit of currency of country i (each bilateral index is converted to 2000=100). The CBK applies separate weights to imports and exports for Kenya's eight largest trading partners (USA, the Euro area, South Africa (imports), the UK, India, Japan, Uganda (exports), and Tanzania (exports)). REER3p is a simple average of Kenya's CPI-based bilateral real exchange rate indices *vis-à-vis* Brazil, Chile, China, India, Malaysia, and Tunisia.
Panels 2–6: Growth of nominal dollar exports; growth of constant local currency GDP. Gross (domestic) saving=GDP–private consumption–government consumption. Gross investment=gross fixed capital formation. CA surplus=trade surplus+net factor income+net unilateral transfers received. The number of third-party exporters in panels 2–6 varies depending on data availability.
Source: World Bank, *World Development Indicators* online.

by far the largest). The underlying bilateral real exchange rates are measured here as Kenya's consumer price index divided by the foreign consumer price index, converted to Kenya shillings at the relevant bilateral official exchange rate. As the price indices refer to different baskets of goods, only changes in the REER, not its level, are meaningful; we have arbitrarily set the level to 100 in 2000. Figure 8.7 shows that the REER has appreciated substantially since 2002, in line with the deterioration in the trade balance over the same period (recall Figures 8.2 and 8.3). These two phenomena are of course closely related. There is ample evidence that trade flows respond to the real exchange rate, both across developing countries and in Kenya (Ghei and Pritchett, 1999; Mwega and Ndung'u, 2001; Were *et al.*, 2002). It is also well established empirically that a surge in net capital inflows tends, in the short run, to produce an excess demand for non-traded goods and a real appreciation (the label 'Dutch

disease' applies to the resulting loss in competitiveness of dynamic export sectors; see Edwards, 1989; Hinkle and Montiel, 1999).

Panel 1 of Figure 8.7 also examines Kenya's exchange rate competitiveness *vis-à-vis* a set of six third-party exporters, using this term to refer to developing countries whose exports have grown rapidly in recent years and may pose formidable challenges to Kenyan exports in major industrial country markets. These include some of the economies routinely cited in support of the positive externalities to producing manufactured goods for world markets. Some of these countries, e.g. China and Tunisia, are known not just for their export success but also for their aggressive pursuit of real exchange rate targets. Kenya shares some important features with these economies, including labour abundance, a coastal location, and a tradition of relative macroeconomic stability. In some other respects, including relative endowments of human capital versus natural resources, the credibility of government commitments to export competitiveness, and perceived political stability, Kenya's situation appears to differ substantially.

Panel 1 shows the average bilateral external real exchange rate index against these third-party competitors, again set arbitrarily to 100 in 2000. This measure is directly comparable to the REER except in its country composition and its use of a simple rather than a weighted average. It is clear that Kenya's real exchange rate has appreciated even faster relative to the third-party group than it has with respect to its trading partners.[21]

8.3.3 Targeting an undervalued shilling: strategic considerations

Globally, country episodes of sustained rapid growth since 1960 have typically been accompanied by sharp increases both in the share of manufacturing in exports and GDP and in the share of exports in GDP (Eichengreen, 2008). What role does monetary policy have in achieving this outcome?

We briefly develop four points. First, although Kenya has judiciously avoided acute overvaluation over the years, the empirical literature has become increasingly favourable to the view that undervalued exchange rates are good for growth. Second, however, the real exchange rate is only one of many determinants of export performance in Kenya, and probably not the most important. Third, the issue of appropriate policy assignment is important. Fiscal policies are far more prominent than monetary policies in determining the real exchange rate in the medium to long run, and within the domain of monetary policy, regulatory policies should not be overlooked in the midst of debate over policies that operate directly on the exchange rate. Finally, both theory and evidence suggest that using conventional monetary policy instruments to target a depreciated real exchange rate requires the central bank to accept a higher rate of inflation.

THE REAL EXCHANGE RATE AND GROWTH

In a recent survey of the evidence on real exchange rates and growth, Eichengreen (2008) concludes that an undervalued exchange rate can *facilitate* growth, particularly in the early stages of a growth acceleration. Rodrik (2008) takes a stronger position, arguing on the basis of panel evidence that undervaluation positively promotes growth. Both authors acknowledge that, although the underlying mechanisms are not fully understood, the observed correlations rely strongly on the expansion of manufactured exports in a succession of fast-growing Asian economies, both before and after the Asian financial crisis of 1997. The most prominent recent example is China. Dooley —*et al.* (2007) interpret China's currency policy as an attempt to attract FDI in a situation of rural labour surplus. The strong currency keeps the cost of labour low in dollar terms, encouraging inward investment, which generates rapid growth of employment, exports, and GDP.

These assessments are less agnostic than earlier literature, which argued that, although acute overvaluation was damaging to growth, modest levels of over- or undervaluation had little systematic impact (e.g. Razin and Collins, 1999). The classic form of acute overvaluation arises in a managed exchange rate regime when the monetary authority attempts to maintain a non-inflationary path for the exchange rate while providing the government with easy monetary finance. As long as the rate of inflation implied by the government's demand for monetary finance exceeds the rate of crawl of the exchange rate, the situation is unsustainable. The domestic relative price of non-traded goods rises relative to the prices of traded goods, which are held down by the nominal exchange rate; the booming non-traded goods sector draws labour and other productive resources out of the increasingly non-competitive export sector, and exports fall; imports rise, particularly as the private sector comes to understand that the period of cheap imports is likely to be temporary. The trade balance worsens, and external liabilities accumulate. The central bank may tighten exchange controls in the hope of stemming reserve losses, but unless the macroeconomic fundamentals are corrected – in this case, via fiscal adjustment – a currency crisis ensues, forcing the central bank to give up its exchange rate objective and accept higher inflation.

Although we have argued that the CBK pays attention to the path of the exchange rate, the danger of an acute overvaluation driven by fiscal accommodation and aversion to devaluation seems remote. In contrast to its neighbours, Kenya did not allow its exchange rate to become sharply overvalued during the 1970s and 1980s. This in turn reflected, in part, a stronger tradition of fiscal discipline – as witnessed, for example, in the substantial adjustment of the fiscal balance and domestic saving in the face of declining external capital flows during the 1980s. But it also reflected a willingness to devalue the official exchange rate – and tolerate the resulting open inflation in the

prices of traded goods – rather than allowing the parallel premium to get extremely large and suffering the attendant distortions.[22] This commitment was buttressed in 1994 by Kenya's acceptance of the obligations of Article VIII status in the IMF. Moreover, any existing willingness to allow necessary exchange rate adjustments to take place, rather than resisting them, has become progressively easier since the mid-1990s, as firms and financial markets have come to expect some degree of exchange rate adjustment in response to shocks.[23]

SOURCES OF EXPORT COMPETITIVENESS

Although the growth evidence is somewhat more favourable than previously to the positive impact of undervaluation, the real exchange rate is only one of many determinants of export performance. We develop this point in the appendix (see note 20), by analysing the investment environment for exports within a version of the classic traded goods/non-traded goods model. Along with the real exchange rate, the model emphasizes a wide range of determinants of costs and productivity, including tariff rates on imported equipment, explicit taxes and bureaucratic predations on the export sector, and the cost and quality of public infrastructure capital and public services.

KIPPRA (2009) adopts a holistic perspective that is fully consistent with our analysis. Of the four key competitiveness priorities stressed in the KIPPRA report – education and training, the business environment, technology and innovation, and infrastructure development – monetary policy enters only in the second, and there not through the value of the shilling but through the favourable impact of macroeconomic stability on the business environment. We return below to whether targeting a weak shilling will enhance macroeconomic stability; the answer is much less clear than in the case of avoiding acute overvaluation. But a targeting policy should always be viewed (if at all) as a complement to action in these microeconomic and institutional arenas, not as a substitute. Inappropriate sequencing – real depreciation before the establishment of key preconditions for an investment response – could expose the economy to a spiral of weak supply responses and macroeconomic instability.

POLICY ASSIGNMENT

We turn now to the policy objective of achieving an undervalued shilling over periods longer than the short term (e.g. a year or more). The central point is that the real exchange rate is an endogenous variable. The full range of macroeconomic shocks and policies affects its value over time. Fiscal policy is among the most important determinants of the equilibrium real exchange rate at all horizons, operating primarily on the demand side in the short to medium run, via the size and non-traded/traded composition of government

spending (Edwards, 1989).[24] Monetary policy, in contrast, is generally viewed as incapable of affecting the level of any real variable in the long run. This suggests that cases of successful real exchange rate targeting are highly likely to have involved fiscal actions that eventually bore the brunt of sustaining target values for the real exchange rate.

A return to Figure 8.7 underlines this point. The most dramatic difference between Kenya and the third-party group is in the levels of saving and investment. Moreover, this difference operates not just on average – year in and year out – but also over the period since 2002, when Kenya's real exchange rate diverges from that of the third-party group. Kenya's investment boom over this subperiod was financed externally, whereas a similar investment boom among third-party competitors was financed internally. To the degree that *Vision 2030* anticipates a continued strong contribution from foreign financing, it does not look like a 'weak exchange rate' strategy, at least in the early stages. Avoiding an equilibrium real appreciation that undermines export competitiveness will require a policy environment that is conducive to a high rate of saving out of income growth.

A final point on policy assignment relates to the distinction we made in the previous section between regulatory policies and the use of traditional stabilization instruments. Above, we emphasized the concept of *ex ante* vulnerability to reversals of capital flows and provided some corroboration of indicators proposed in the literature. Regulatory actions that reduce vulnerability can reduce the macroeconomic risks associated with episodes of real exchange appreciation or depreciation. This responsibility should not be overlooked in the midst of debate over policies that operate directly on the real exchange rate.

RECONCILING REAL EXCHANGE RATE TARGETS WITH INFLATION TARGETS

Finally, what are the macroeconomic consequences of using conventional monetary policy instruments to maintain a weaker real exchange rate than would otherwise be the case? Both theory and experience suggest that, when the capital account is relatively open, using monetary policy in this mode requires the central bank to accept a higher rate of inflation than would otherwise prevail, at least at the outset (Calvo *et al.*, 1995). A weak shilling policy could therefore come into sharp tension with the CBK's existing framework, with its long-standing inflation target of 5 per cent.

The logic of this view is straightforward, and relies on demand-side effects of the type featured in the Dutch disease literature. Achieving a persistent effect on the real exchange rate requires altering the equilibrium real exchange rate, which in turn means altering the demand-and-supply balance in the market for non-traded goods. A fortuitous move in the fundamentals – a shock to foreign financing, for example, or to commodity export prices

– can of course generate the required effect. During the 1990s, for example, conflicts with external donors led to sharp reductions in official development assistance (ODA) in Kenya; other things being equal, these reductions drove down overall spending; part of this fell on non-traded goods, generating a real depreciation.

If monetary policy alone is going to achieve a similar effect, however, monetary instruments must be capable of reducing national spending on non-traded goods. How this is done depends on the degree of capital mobility. When capital mobility is low, a period of tight money and high real interest rates does the job, provided that the fiscal impacts of the higher public debt service can be handled through higher taxes. But when capital mobility is high, monetary policy has little traction over the real interest rate. In this case, the mechanism emphasized by Calvo *et al.* (1995) is a temporary increase in the rate of crawl of the nominal exchange rate, for the duration of the under-valuation episode. This produces a temporary increase in the nominal interest rate and therefore – as cash is needed for purchasing consumer goods – in the effective price of consumption. Consumption falls, and with it the demand for non-traded goods and the real exchange rate.[25]

The likelihood of an increase in inflation suggests that actively targeting an undervalued shilling would require a substantial adaptation in Kenya's monetary framework, which is currently constructed around an inflation target of 5 per cent or below. Widening the inflation band would re-pose the nominal anchor issues discussed in Chapter 7, and the cost of this might reasonably be viewed as too great. Like any consensus about a complex issue of institutional design, however, the consensus that continues to support inflation targeting among emerging market economies reflects the environment that produced it, most notably the Great Inflation among the industrial countries and the rise in global capital mobility. Two broadly competing visions exist – one largely discredited by experience, and the other likely, in our view, to remain a focus of debate. The discredited vision is that central banks can reconcile price stability with competing objectives – including providing ample finance to government – through the use of direct controls in credit and foreign exchange markets. Even Malaysia, widely cited for its use of capital controls in the wake of the Asian financial crisis of 1997, retains a strong preference for fiscal stability, prudential regulations over direct controls, and the maintenance of convertibility for current account purposes (Edwards, 2007). The second competing vision is over how tightly countries should commit to themselves to very low inflation. Even before the global financial crisis of 2008, this issue was more clearly resolved for industrial countries than it was for developing countries. The global evidence suggests that high inflation – 40 per cent was the benchmark used by Bruno and Easterly (1998) – is clearly damaging to long-run growth, and that for industrial countries, the optimal range for inflation, in terms of long-run growth, is quite low (positive but

below 5 per cent). But for low-income countries, the growth benefits of moving from an inflation rate of 10–15 per cent to one of 5 per cent or below (for example) appear to be small, and may even be slightly negative. This debate is likely to be renewed with vigour if one or more industrial countries choose an inflationary exit from burdensome domestic currency debts.

In practice, of course, there may be propitious episodes during which developments in the macroeconomic fundamentals allow the CBK to lean heavily against the shilling while satisfying inflation targets. A resolution of political uncertainties in Kenya, for example, would not only reduce the cost of external finance for Kenya and enhance the prospects of achieving *Vision 2030*, but also potentially generate a sustained increase in the demand for shilling-denominated assets, including bank deposits. In such a situation, a policy of reserve accumulation may be well justified within an inflation targeting framework, even at the risk of violating preset money growth targets, as an alternative to an overshooting appreciation that harms exports and growth (Buffie *et al.*, 2004). The role of the real exchange rate in export competitiveness suggests that the CBK should be alert to such opportunities.

8.4 Conclusions

Kenya embraced an open capital account in the hope of widening portfolio opportunities for domestic residents, attracting foreign finance, and spurring financial development. The trilemma was broadly acknowledged from the outset, in the realization that, if monetary policy was to have any scope for domestic objectives, an open capital account was inconsistent with the maintenance of a heavily managed exchange rate. As outlined in Chapter 7, the framework introduced in the mid-1990s has reproduced itself successfully over time: an inflation target pursued via money base targeting, a market-determined exchange rate, and an intervention policy geared towards containing short-run market volatility rather than guiding the path of the real exchange rate.

Vision 2030 anticipates a substantial increase in private external capital flows, and we have focused in this chapter on two related challenges for monetary policy. The first of these, managing macroeconomic volatility, is central to the CBK's stated mission and to the macroeconomic stability pillar of *Vision 2030*. The second, supporting export competitiveness, is suggested by the role of exports in high-growth countries and the prominence of national competitiveness in *Vision 2030*. These broad concerns will be inherited by a regional central bank should currency union proceed on a fast track, and for this reason, we have not dealt separately with issues of monetary integration.

Our overriding message is that there are limitations to what monetary policy can accomplish without compromising its central roles of maintaining a

nominal anchor and supporting a competitive and robust financial system. This is clearest with respect to real exchange rate targets, where Rodrik (2008) and others have argued that an undervalued exchange rate provides a market-based substitute for industrial policy in promoting non-traditional exports and productivity-enhancing FDI. If, however, other determinants of the investment environment are the binding constraints on these activities, as we believe they are, then the macroeconomic costs of subordinating exchange rate targets to inflation targets are likely to be high. We have also argued that the truly indispensable interventions to support a competitive real exchange rate are those that increase national saving, which is fundamentally a task of fiscal rather than monetary policy.

With respect to macroeconomic stability, we have focused on the degree of capital mobility and its implications for monetary policy. The evidence suggests that capital moves less readily into Kenya than might be expected given its largely open capital account. This is particularly worrisome with respect to FDI, where direct restrictions are absent and the potential advantages in terms of an employment- and export-promoting growth profile are large. Although most of the determinants of FDI are outside the CBK's control, restrictions on non-residents may serve to discourage long-term commitments even in the absence of direct controls on FDI itself. Restrictions on short-term borrowing by banks, in turn, are more readily justified on macroeconomic grounds given the economic costs of a sudden reversal.

Although the evidence we have presented places Kenya well short of the trilemma, we find that capital flows respond to interest rate differentials, exchange rate expectations, and uncertainties about the domestic political process. These effects may well be non-linear, allowing the CBK to achieve considerable short-term smoothing of the exchange rate during normal times but proving illusory in the presence of large shocks. A strategy for keeping these interventions selective and temporary has the advantages of avoiding confusion regarding the CBK's nominal anchor, allowing necessary real exchange rate adjustments to take place, and providing ongoing incentives for the development of private markets for exchange risk. Within such a strategy, however, the CBK should be alert to opportunities to resist large and transitory real appreciations when this can be done without compromising the inflation anchor. The first such opportunity may come as global markets emerge from the financial crisis, if a resolution of political uncertainties in Kenya produces a large portfolio adjustment in favour of the shilling.

Notes

1 We are grateful to Christopher Adam for extensive guidance and suggestions, and to Aart Kraay for providing us with data from Kraay and Nehru (2006). Any errors are our own responsibility.

2 Article VIII status embodies a commitment not to impose exchange controls on current account transactions.

3 Like most measures of *de jure* openness, the IMF indicators reflect only the presence or absence of controls, rather than their intensity. Chinn and Ito (2008) try to capture intensity indirectly, by including controls on the current account (often a conduit for unrecorded capital movements) and adjusting for the duration of capital account restrictions.

4 The other seven are Botswana, Djibouti, Gambia, Liberia, Mauritius, Uganda, and Zambia.

5 These data should be treated with care. Capital flows are notoriously difficult to measure, particularly where they are illegal. Accounting conventions can also differ substantially across countries.

6 Table D12.8, p. 222 reports the ICRG index of government stability for 2006. At 5.9, Kenya's value was the lowest in the table, 2.4 standard deviations below the average of 9.4 for the other sixteen emerging market comparators.

7 This is sometimes referred to as the 'Guidotti–Greenspan rule'.

8 If domestic interest rates are market determined, however, it is unlikely that capital controls alone can explain a persistently negative risk premium. The reason is that domestic investors have the alternative of investing in other domestic assets. Low market-determined rates on government securities may reflect, at least in part, regulations that compel banks and other financial firms to hold these securities.

9 A more sophisticated approach would incorporate the transmission channel from the repo rate to the T-bill rate. The evidence regarding policy transmission from policy to market rates is mixed. Cheng (2006) finds that the interest rate channel is weak, and attributes this to structural limitations in Kenya's financial sector. Maturu (2007) finds greater evidence of effective transmission from the repo rate to money market rates including the T-bill rate.

10 Countries may of course have felt compelled to do the opposite – to cut interest rates in order to act as lender of last resort to the banking sector. In either case, the interest rate response belongs in the dependent variable.

11 In Equation (8.6), reserves and the exchange rate are both measured in US dollars and at the end of the month. The discount rate is a monthly average.

12 By these criteria, Kenya experienced eighteen years of debt distress between 1975 and 2002, the most recent associated with a combination of arrears and Paris Club debt relief in 2000–02 (Kraay and Nehru, 2006).

13 Rose and Spiegel (2009) report a similarly mixed result for the significance of size and income. In their sample, which includes the industrial countries, there is some evidence that the smaller countries were harder hit.

14 From this perspective, the impressive rate of FDI into Tanzania and Uganda by Kenyan firms raises questions about the overall investment environment in Kenya, as these firms could serve the regional market from Kenya.

15 The real exchange rate is sometimes defined as the price of domestic goods relative to foreign goods, measured in a common currency. These parallel concepts are known as the 'internal' and 'external' real exchange rate (see Hinkle and Montiel, 1999).

16 They mean the most popular *formal* real target, for example via announced or unannounced purchasing power parity (PPP) rules that adjust the rate of crawl *vis-à-vis* a currency or basket to the difference between domestic and foreign inflation.

17 The Reinhart and Rogoff classification is based solely on observed exchange rate movements, and therefore does not distinguish sharply between regimes that implement PPP rules or other formal approaches to real exchange rate targeting (the topic of Section 8.3.3), and regimes that limit short-run exchange rate volatility while allowing considerable medium- to long-term movement in the real exchange rate. Kenya maintains a formal target of four months of imports, and the CBK is therefore in the foreign exchange markets intermittently for reserve management purposes. This may provide cover for modest interventions that smooth out extremes, without implying any sustained commitment to a particular path for the real exchange rate.

18 Eichengreen (2008) surveys the empirical literature on real exchange rate volatility and growth and finds mixed results; some studies find a negative relationship between the two variables, and others conclude that exchange rate variability has no impact. Causality is often unclear, he argues, because macroeconomic crises tend to be associated with large real exchange rate changes.

19 Eichengreen (2008) notes the rapid development of these markets following the Asian financial crisis and the transition to greater exchange rate flexibility in affected countries.

20 The appendix can be downloaded from http://www.swarthmore.edu/SocSci/soconne1/research.html.

21 In the appendix (see note 20), we develop a second comparison versus the third-party group based on a measure of absolute price competitiveness developed by Johnson *et al.* (2007). This measure has the advantage of being directly comparable across countries. It evolves similarly over time to REER3p, and indicates that Kenyan prices were overvalued by roughly 20 per cent *vis-à-vis* the third-party group in 2007.

22 Consistent with this, Maturu (2002) finds that the degree of exchange rate misalignment during the mid- to late 1990s, following financial sector liberalization and adoption of the market-determined exchange rate, was not substantially different from patterns observed in the pre-liberalization period of the 1980s.

23 Recent studies of real exchange rate misalignment in Kenya have generated mixed results. Mwega (2007) reports an overvaluation of 40.8 per cent in 2005, with updated results suggesting a continued large overvaluation in 2006 and 2007. But Pollin and Heintz (2007) find milder degrees of misalignments in the mid-2000s, and the IMF (2008) shows an undervaluation in 2006–07. Where these authors agree is on the importance of non-monetary determinants of export performance.

24 The medium- to long-term impact of fiscal policy on the real exchange rate operates primarily via the supply side and is much less well understood. Adam and Bevan (2006) emphasize the importance of how public infrastructure investment affects sectoral productivities.

25 Lizondo (1991) and Montiel and Ostry (1991) develop models in which the monetary authority can engineer a *permanent* real depreciation by increasing the inflation rate. In these models, however, it is ultimately a fiscal rather than a monetary effect that generates the real depreciation. The increase in inflation generates a transfer of seigniorage revenues to the government, which is assumed to spend less intensively on non-traded goods than the private sector does.

References

Adam, C. and D. Bevan, 2006, 'Aid and the Supply Side: Public Investment, Export Performance, and Dutch Disease in Low-Income Countries', *World Bank Economic Review*, 20 (2), 261–290.

Aghion, P., P. Bacchetta, R. Ranciere and K. Rogoff, 2006, 'Exchange Rate Volatility and Productivity Growth: The Role of Financial Development'. NBER Working Paper No. 12117, March.

Aizenman, J., B. Pinto and A. Radziwill, 2007, 'Sources for Financing Domestic Capital – Is Foreign Saving a Viable Option for Developing Countries?' *Journal of International Money and Finance*, 26, 682–702.

Ariyoshi, A., K. Habermeier, B. Laurens, I. Otker-Robe, J. I. Canales Kriljenko, and A. Kirilenko, 2000, 'Capital Controls: Country Experience with their Use and Liberalization'. IMF Occasional Paper No. 190.

Bruno, M. and W. Easterly, 1998, 'Inflation Crises and Long-Run Growth', *Journal of Monetary Economics*, 41 (1), 3–26.

Buffie, E., C. Adam, S. O'Connell, and C. Pattillo, 2004, 'Exchange Rate Policy and the Management of Official and Private Capital Flows in Africa'. *IMF Staff Papers*, 51 (Special Issue), 126–160.

Calvo, G. A. and C. M. Reinhart, 2002, 'Fear of Floating', *Quarterly Journal of Economics*, 47, 379–408.

Calvo, G., C. Reinhard and C. Vegh, 1995, 'Targeting the Real Exchange Rate: Theory and Evidence', *Journal of Development Economics*, 47, 97–133.

Cheng, K., 2006, 'A VAR Analysis of Kenya's Monetary Policy Transmission Mechanism: How Does the Central Bank's REPO Rate Affect the Economy?'. IMF Working Paper WP/06/300, December.

Chinn, M. and H. Ito, 2008, 'A New Measure of Financial Openness', *Journal of Comparative Policy Analysis*, 10 (3), 309–322.

Dooley, M. P., D. Folkerts-Landau and P. Garber, 2007, 'Direct Investment, Rising Real Wages, and the Absorption of Excess Labor in the Periphery', in R. H. Clarida (ed.) *G7 Current Account Imbalances: Sustainability and Adjustment.* Chicago: University of Chicago Press: 103–126.

Edwards, S., 1989, *Real Exchange Rates, Devaluation, and Adjustment.* Cambridge, MA: MIT Press.

Edwards, S. ed., 2007, *Capital Controls and Capital Flows in Emerging Economies: Policies, Practices, and Consequences.* Chicago: University of Chicago Press.

Eichengreen, B., 2008, 'The Real Exchange Rate and Economic Growth'. World Bank, Commission on Growth and Development, Working Paper No. 4.

Eichengreen, B., A. K. Rose and C. Wyplosz, 1994, 'Speculative Attacks on Pegged Exchange Rates: An Empirical Exploration with Special Reference to the European Monetary System', in Canzoneri, M., P. Masson and V. Grilli (eds) *The New Transatlantic Economy.* Cambridge: Cambridge University Press.

Flood, R. P. and A. K. Rose, 2002, 'Uncovered Interest Parity in Crisis'. *IMF Staff Papers*, 49 (2), 252–266.

Ghei, N. and L. Pritchett, 1999, 'The Three Pessimisms', in Hinkle, L. E. and P. J. Montiel (eds) *Exchange Rate Misalignment: Concepts and Measurement for Developing Countries.* Oxford: Oxford University Press.

Hausmann, R. and D. Rodrik, 2003, 'Economic Development as Self-Discovery', *Journal of Development Economics*, 72, 603–633.

Hinkle, L. E. and P. J. Montiel, 1999, *Exchange Rate Misalignment: Concepts and Measurement for Developing Countries*. Oxford: Oxford University Press.

IMF, Monetary and Capital Markets Department, 2007, *Review of Exchange Arrangements, Restrictions, and Controls*. Washington, DC: International Monetary Fund.

IMF, 2008, 'Kenya: Ex Post Assessment of Longer-Term Program Engagement'. 4 August. http://www.imf.org/external/pubs/cat/longres.cfm?sk=22423.0.

IMF, 2009, 'Kenya: Selected Issues and Statistical Appendix'. IMF Country Report No. 09/192, June.

Johnson, S. H., J. Ostry and A. Subramanian, 2007, 'The Prospects for Sustained Growth in Africa: Benchmarking the Constraints'. IMF Working Paper 07/52, March.

Kenya Institute for Public Policy Research and Analysis (KIPPRA), 2009, *Kenya Economic Report 2009: Building a Globally Competitive Economy*. Nairobi: KIPPRA.

Kraay, A. and V. Nehru, 2006, 'When is External Debt Sustainable?' *World Bank Economic Review*, 20 (3), 341–365.

Lizondo, J. S., 1991, 'Real Exchange Rate Targets, Nominal Exchange Rate Policies, and Inflation', *Révista de Análisis Económico*, 6, 5–22.

Maturu, B. O., 2002, 'Modeling the Real Exchange Rate for Kenya, 1980–1998'. Unpublished PhD thesis, Jomo Kenyatta University of Agriculture and Technology, Institute for Human Resource Development.

Maturu, B. O., 2007, 'Channels of Monetary Policy Transmission in Kenya'. Paper presented during the 12th Annual African Econometric Society Conference in Cape Town, South Africa; http://www.africametrics.org/conference-papers.html (Day 2, Session 6, Track 1).

Montiel, P. J. and J. Ostry, 1991, 'Macroeconomic Implications of Real Exchange Rate Targeting in Developing Countries'. *IMF Staff Papers* 39, 58–78.

Mwega, F. M., 2007, 'The Exchange Rate, External Balance and Economic Growth in Kenya'. Prepared for the School of Economics Workshop on Policy Options in Achieving the Kenya Vision 2030, 30 May.

Mwega, F. M. and N. S. Ndung'u, 2001, 'Kenya's Recent Exchange-Rate Policy and Manufactured Export Performance', in Fosu, A. K., S. M. Nsouli and A. Varoudakis (eds) *Policies to Promote Competitiveness in Manufacturing in Sub-Saharan Africa*. Development Centre Seminars with the IMF and the AERC OECD. Paris: OECD, 33–56.

Mwega, F. M. and N. S. Ndung'u, 2008, 'Explaining African Economic Growth Performance: The Case of Kenya', in Ndulu, B. J., S. A. O'Connell, J.-P. Azam, R. H. Bates, A. K. Fosu, J. W. Gunning and D. Njinkeu (eds) *The Political Economy of Economic Growth in Africa, 1960–2000. Volume 2: Country Case Studies*. Cambridge: Cambridge University Press, 325–368.

Ndung'u, N. S., 2000, 'The Exchange Rate and Monetary Policy in Kenya', *African Development Review*, 12 (1), 24–51.

Ndung'u, N. S. and W. R. Ngugi, 1999, 'Adjustment and Liberalization in Kenya: The Financial and Foreign Exchange Market', *Journal of International Development*, 11 (3), 465–491.

Obstfeld, M. 2008, 'International Finance and Growth in Developing Countries: What Have We Learned? ' Commission on Growth and Development, Working Paper No. 34. Washington, DC: The World Bank.

Pollin, R. and J. Heintz, 2007, 'Expanding Decent Employment in Kenya: The Role of Monetary Policy, Inflation Control, and the Exchange Rate'. International Poverty Centre Country Study No. 6, March.

Razin, O. and S. M. Collins, 1999, 'Real Exchange Rate Misalignments and Growth', in Razin, A. and E. Sadka (eds) *The Economics of Globalization: Policy Perspectives from Public Economics*. Cambridge: Cambridge University Press, 59–81.

Reinhart, C. M. and K. S. Rogoff, 2004, 'The Modern History of Exchange Rate Arrangements: A Reinterpretation', *Quarterly Journal of Economics*, 119 (1), 1–48.

Republic of Kenya (ROK), 2009, *Annual Public Debt Management Report, July 2007–June 2008*, Office of the Deputy Prime Minister and Ministry of Finance (Debt Management Department); http://www.treasury.go.ke.

Rodrik, D., 2008, *The Real Exchange Rate and Economic Growth*. Cambridge, MA: John F. Kennedy School of Government, Harvard University.

Rose, A. K. and M. M. Spiegel, 2009, 'Cross-Country Causes and Consequences of the 2008 Crisis: Early Warning'. Unpublished draft, Haas School of Business and FRB San Francisco, 22 September.

Were, M., N. S. Ndung'u, A. Geda and S. N. Karingi, 2002, 'Analysis of Kenya's Export Performance: An Empirical Evaluation'. KIPPRA Discussion Paper No. 22. Nairobi: Kenya Institute for Public Policy Research and Analysis.