



## Annex V

# Risk Management of Sovereign Liabilities

The integration of emerging market countries into the global economy and their greater access to external sources of financing have produced a corresponding increase in their exposure to swings in international asset prices. Developing country sovereign entities are especially exposed to international disturbances because of their large stock of unhedged foreign currency debt (relative to national income), and the fairly risky structure of their debt portfolios (currency composition and maturity profile). In a relatively unfamiliar, and at times volatile, international financial environment, the benefits earned by countries through prudent macroeconomic management and structural reforms can be severely compromised by losses due to unexpected changes in interest rates and exchange rates.<sup>1</sup>

The major multinational firms (both financial and nonfinancial) have adapted to similar risks by extensively using hedging techniques and derivative instruments to manage their risk exposures. The use of such techniques has been facilitated by important advances in financial technology in the last decade and by specialized risk management techniques developed by institutional funds managers. In contrast, many sovereign entities—some of them major players in international financial markets with large financial assets and liabilities—have lagged, by and large, behind the private sector in this respect. The recent experience of a small, but growing, number of sovereign borrowers that have reformed their liabilities management practices demonstrates that sound risk management can reduce the impact of external financial developments on debt portfolios, and potentially lower the cost of borrowing.

The existing literature on risk management is rich in its treatment of portfolio allocation problems, but it provides little guidance for sovereigns on how to manage the risk associated with sovereign debt exposures. By drawing on the experience and the well-established methodologies of large institutional investors and pension funds, and on the experience of sovereigns that have reformed their debt management policies, this annex examines three issues: (1) the risks involved for a government in carrying a large open

foreign currency exposure; (2) the design of institutional arrangements that provide appropriate incentive structures for debt management; and (3) the establishment of benchmark portfolios embodying strategic preferences for incurring currency, interest rate, and credit risks, and the macroeconomic and institutional constraints on the country. These issues raise questions about the optimal currency exposure of a sovereign; the extent of interaction between debt management policy and monetary policy; and the degree of independence of debt management from political oversight. These issues are relevant for most countries—not just the emerging markets.

### Foreign Currency Exposure of Sovereign Liabilities

The external exposure of developing countries' sovereign liabilities has increased steadily during the past two decades, from 7 percent of GDP in 1975 to about 30 percent in the mid-1990s (Figure 56). In 1995, the external debt held or guaranteed by developing country sovereigns was almost three times larger than their foreign currency reserves, exposing governments to a large net currency risk (Table 64). Foreign currency debt also exposed developing countries to foreign interest rate risk. Indeed, about half of developing countries' external debt was exposed to foreign interest rate risk, as 20 percent of the external debt was short term (under a one-year maturity) and 40 percent of the remaining long-term debt was at floating rates (mostly indexed to LIBOR).

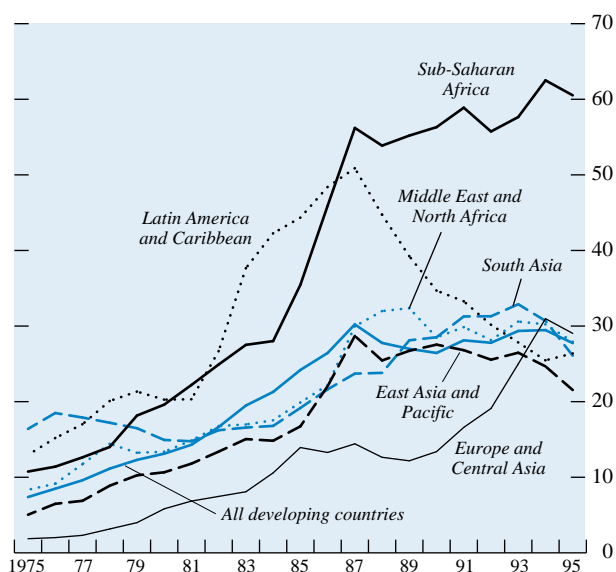
Several developing countries have experienced the impact of adverse movements in foreign currencies and interest rates over the past twenty years. In the early 1980s, the debt-servicing burdens of countries in Southeast Asia, Latin America, and Africa were severely affected by the steep appreciation of the dollar, the worldwide increase in interest rates, and the sharp decline in commodity prices. This debt crisis resulted in output and employment losses, financial sector crises, and the exclusion of these countries from international financial markets for a decade.

In the first half of the 1990s, several Asian countries that had overcome the effects of the 1980s debt crisis through prudent fiscal policies experienced sig-

<sup>1</sup>This annex draws on the analysis in Cassard and Folkerts-Landau (forthcoming).

**Figure 56. External Long-Term Public and Publicly Guaranteed Debt Outstanding**

(In percent of GNP)



Source: World Bank, *Global Development Finance* database.

Note: The groupings are as shown in the source.

nificant increases in their debt burden due to their exposure to the Japanese yen. Between 1980 and 1994, East Asian and Pacific countries expanded their borrowing in Japanese yen from below 19 percent to 30 percent of total debt. Although the increase in yen-denominated borrowing was due partly to large concessional loans from Japan to Asian countries and the growing role of the yen in international trade and finance, it also reflected the desire of Asian borrowers to benefit from low interest rates on yen loans compared with U.S. dollar loans. Most of the countries did not hedge their yen exposure either in local currency or in the U.S. dollar, which accounts for a large part of their foreign currency revenues. As a result, the appreciation of the yen vis-à-vis the dollar and the Asian currencies in the 1990s led to a significant rise in the dollar value of their external liabilities (Table 65). The share of yen-denominated debt in total debt was subsequently reduced to 27 percent in 1995, and the share of yen-denominated foreign reserves enlarged.

In Indonesia, for example, a third of the increase in the dollar value of the external debt between 1993 and 1995 was due to cross-currency movements, primarily the appreciation of the yen. Indonesia's exposure to the yen has been especially costly as about 90 percent of its export revenues were denominated in dollars, while 37 percent of its external debt was denominated

**Table 64. Long-Term Public and Publicly Guaranteed External Debt Outstanding and Reserves Excluding Gold in Selected Developing Countries, 1995**

(In billions of U.S. dollars)

	Long-Term Public and Publicly Guaranteed External Debt Outstanding	Total Reserves Excluding Gold
<b>Asia</b>		
China	94.7	75.4
India	79.7	17.9
Indonesia	65.3	13.7
Malaysia	15.9	23.8
Philippines	29.9	6.4
Thailand	17.2	36.0
<b>Europe</b>		
Czech Republic	9.6	13.8
Hungary	23.6	12.1
Poland	41.1	14.8
Russia	100.3	14.4
Turkey	50.1	12.4
<b>Western Hemisphere</b>		
Argentina	62.2	14.3
Brazil	96.6	49.7
Colombia	13.0	8.1
Mexico	94.0	16.8
Venezuela	28.5	6.3
<b>Memorandum item:</b>		
All developing countries <sup>1</sup>	1,448.6	538.4

Sources: International Monetary Fund, *International Financial Statistics* (June 1997); and World Bank, *Global Development Finance 1997*.

<sup>1</sup>World Bank data. International reserves include the country authorities' holding of SDRs, the reserve position in the IMF, foreign exchange holdings, and gold.

in yen. In the Philippines, which has a third of its external debt denominated in yen, the appreciation of the yen accounted for about half of the rise in the dollar value of the external debt in 1995. In China, the appreciation of the yen is estimated to have increased the servicing costs of the public debt by about \$5 billion. In Malaysia, the sharp appreciation of the yen in 1994 bumped up the dollar value of the external debt by 6 percent. In India, the external debt increased by almost 7 percent in 1995, almost exclusively on account of exchange rate changes.<sup>2</sup> The subsequent depreciation of the yen in 1996 offset some of the losses incurred by these countries.

The vulnerability of developing countries to external shocks is largely a function of the maturity profile of their foreign currency debt. A distinction needs to be made between a *short-maturity* foreign currency

<sup>2</sup>Changes in external debt are measured in dollar terms, as the latter is the main trade or invoice currency for Asian developing countries. The dollar is also the main currency against which Asian domestic currencies are managed (e.g., Indonesia, Philippines).

**Table 65. External Debt Profile of Selected Asian Countries, 1995**

	China	India	Indonesia	Malaysia	Philippines	Thailand
External debt (in U.S. dollars)	118.1	93.8	107.8	34.4	39.4	56.8
External debt (in percent of GNP)	17.2	28.2	56.9	42.6	51.5	34.9
External public debt (in percent of GNP)	13.8	24.0	34.5	19.7	39.1	10.6
External public debt/reserves (in percent)	1.2	3.5	4.4	0.6	3.9	0.5
Short-term debt (in percent of total debt)	18.9	5.4	20.7	21.2	13.4	32.2
Share of long-term debt at variable rates	29.6	24.4	48.1	57.3	39.2	62.8
Currency composition of long-term debt (in percent)						
U.S. dollars	57.9	53.3	21.5	45.1	31.5	26.6
Deutsche mark	1.7	6.5	4.9	1.1	1.5	2.3
Japanese yen	20.7	13.7	35.4	31.7	36.9	48.1
Other	19.7	26.5	38.2	22.1	30.1	23.0
Changes in debt stocks due to cross-currency valuations (1990–95)	6.8	6.8	12.7	3.2	4.4	5.5

Source: World Bank, *Global Development Finance 1997*.

debt and a *short-duration* foreign currency debt.<sup>3</sup> In the event of a currency crisis, a government with a short-maturity debt is exposed to both currency and interest rate risks, because both interest and principal payments have to be refinanced at the higher exchange and interest rates. A short-duration, long-maturity debt, however, exposes a sovereign only to interest rate risk, because the principal does not necessarily have to be refinanced during the crisis.

Events in Mexico during 1994–95 illustrate how reliance on short-term foreign currency debt can make a country vulnerable to liquidity crises, as the need to refinance a substantial volume of short-term debt in turbulent foreign exchange markets creates additional market pressure.<sup>4</sup> One of the lessons of the Mexican experience is that the external risk exposure of the government (currency composition, maturity profile, share of floating-rate debt, concentration of maturities) is as indicative as its debt leverage of its vulnerability to external shocks. Indeed, the Mexican crisis was partly attributable to financial markets' concerns about the currency composition and maturity of the public debt and not by its actual level, which was relatively low by OECD standards—51 percent compared with an OECD average of 71 percent.<sup>5</sup> The vulnerability of the Mexican economy to a financial crisis was exacerbated by the \$29 billion of tesobonos maturing in 1995, with about \$10 billion maturing in the first quarter, in light of the low level of foreign reserves (\$6.3 billion) as of end-1994. Had the maturity of the tesobonos been longer and not bunched in the same quarter, the exchange rate crisis might not have turned into a debt-servicing crisis.

The large stock of foreign currency debt held by developing countries is a consequence of several historical and structural factors, including low domestic saving rates, the lack of domestic borrowing instruments, and reliance on official financing (multilateral and bilateral), which tends to be denominated in donor countries' currencies. Foreign currency debt may also be issued to signal the government's commitment to a policy of stable exchange rates or prices. In a game theory framework, the policymaker signals the time-consistency and credibility of policies to the public by raising the cost of renegeing on the commitment. More recently, as emerging markets have regained access to international debt markets, the choice of currencies and the maturity structure of their external borrowing has often been driven by the lower risk premiums and coupon rates, and the corresponding initial budget savings.<sup>6</sup> Such unhedged debt strategies may be underestimating the risks associated with foreign currency borrowing for several reasons.

First, the capacity of governments to generate foreign currency revenues to repay their obligations is generally limited because government assets are predominantly the discounted value of future taxes denominated in the local currency. Governments have direct access to foreign currency revenues only when the economy is dominated by a public sector that derives most of its revenues from exports (e.g., oil, gold). Under those circumstances, foreign currency borrowing creates a natural hedge to the sovereign exposure. In a privatized and open economy, however, the government's currency exposure is limited to the

<sup>3</sup>The *duration* of a security differs from its *maturity* in that it takes into account the interest payments and amortization during the lifetime of the loan.

<sup>4</sup>See IMF (1995) for a discussion of the role of short-term foreign currency debt in the Mexican crisis.

<sup>5</sup>Calvo and Goldstein (1995).

<sup>6</sup>Several emerging market governments (e.g., Argentina, Colombia, Hungary, Mexico, and Turkey) have issued debt denominated in yen and deutsche mark in the past few years, without having a significant exposure to those currencies on the revenue side. Following the negative impact of the yen appreciation in 1994–95, a few of these countries (Colombia, Hungary, Mexico) began reducing or hedging their yen exposure.

sensitivity of its revenues to foreign currencies. Such sensitivity may be negligible if the private sector hedges its own currency risk exposure, which is the case in most industrial countries and many emerging markets.<sup>7</sup> In such instances, unless foreign currency borrowing accurately hedges the currency exposure of fiscal revenues, it exposes the sovereign to currency risk.

This representation of the scope of sovereign currency risk exposure may be criticized as too narrow on the grounds it does not include the financial exposure of various sectors of the economy (e.g., the banking system, the pension and social security funds, the energy sector) that have systemic risks that may spill over to the public sphere. But managing this broader definition of sovereign risk requires knowledge of the risk exposure of various sectors of the economy, of the correlations of risks among sectors, and of the extent to which the private sector hedges itself against those risks. In practice, governments rarely have access to such comprehensive information.

Second, it is unlikely that the output, welfare, and reputational costs that a developing country may suffer in the event of an adverse external shock are fully taken into account in emerging markets' external borrowing strategies. Although financial crises are low-probability events, their potential for disrupting the economy is substantial. Indeed, a net foreign exchange exposure exacerbates the impact of external shocks on the economy and limits the policy options of the authorities during a financial crisis. A sovereign with a large net foreign currency exposure would have difficulty pursuing an expansionary monetary policy to reflate the economy during a financial crisis, because it might cause a sharp decline in the domestic currency. A depreciation of the exchange rate would worsen the country's indebtedness and risk profile, and magnify, rather than dampen, the financial crisis. In the event of an adverse real exchange rate shock, a government may face the dual cost of a hike in its external-debt-servicing expense and a fall in the foreign currency value of its revenues.<sup>8</sup> In addition to the potential capital losses that a government may incur on its debt portfolio, its ability to access international markets to refinance its maturing debt is likely to be hindered.

Third, there is no conclusive empirical evidence that the diversification benefits of unhedged foreign currency borrowing outweigh the added risk from the

effect of nominal and real exchange rate fluctuations on the debt portfolio.<sup>9</sup> By contrast, there are numerous studies of internationally diversified portfolios that show that investors can lower their risks without significant changes in returns by completely hedging their exposure to exchange rate movements, that is, purchasing power and interest rate parities do not hold.<sup>10</sup> During the 1980s, irrespective of investors' base currencies, the returns on currency-hedged foreign bond portfolios were less volatile than the returns on unhedged portfolios. Although such studies apply to portfolios held by institutional investors, sovereign entities are unlikely to predict the direction of exchange rates more accurately than they do.

In view of the risks associated with large, open foreign currency exposures and the existence of deep and liquid domestic capital markets, the governments of most industrial countries have limited their issuance of foreign currency debt. Among large advanced economies, Germany, Japan, and the United States do not issue foreign currency debt, while France and the United Kingdom issue only a small fraction of their debt in European currency units (ECUs). In Italy, foreign currency debt accounts for 6 percent of total government debt; in Canada, it represents about 3 percent of total public debt (reflecting debt accumulated in the past and debt issued to finance foreign reserves), and the budget deficit is funded entirely in domestic currency. In recent years, a number of small advanced economies, including Belgium and New Zealand, have stopped issuing foreign currency debt, except for replenishing their foreign reserves. In Ireland, gross foreign currency borrowing is limited to the level of maturing foreign currency debt. Spain and Sweden issue foreign currency debt, but hedge their currency risk through swaps or swap options (in Sweden only against the currency composition of the foreign currency benchmark, not against the exposure in kronor).

In developing countries, however, governments often need to access international debt markets to offset a shortage of local savings, lengthen the maturity of their debt, diversify their interest rate risk exposure across various asset markets, accumulate foreign exchange reserves, or develop benchmark instruments enabling domestic private entities to issue abroad.<sup>11</sup> When derivative markets (e.g., forward, futures, swap, options) in the domestic currency are available, governments can immediately hedge their foreign currency borrowing, thereby limiting their exposure to foreign exchange and interest rate movements. The

<sup>7</sup>There are definite benefits from estimating and hedging the exposure of fiscal revenues to foreign exchange rates—that is, estimating the impact of nominal and real exchange rates on export and import taxes, and on the taxation of exporters and multinationals' profits. Disentangling the effect of domestic and external factors on revenues, however, is likely to be difficult for an open economy with a diversified private sector.

<sup>8</sup>Dooley (1997).

<sup>9</sup>The overall risk of the portfolio may be reduced if the domestic currency cost of domestic debt is negatively correlated with the domestic currency cost of foreign currency debt.

<sup>10</sup>See for instance Perold and Schulman (1988), Eaker, Grant, and Woodard (1993), Glen and Jorion (1993), and Kritzman (1993).

<sup>11</sup>Global bonds, for instance, are a successful vehicle for countries (e.g., Italy, Argentina) to access a wide array of international investors.

foreign currency can be hedged into the domestic currency or into a currency closely correlated to the domestic currency that has liquid derivative markets. Issuing currency-hedged foreign debt would preclude a borrowing strategy solely targeted at reducing interest rate costs and softening internal budget constraints.

Almost all industrial countries and many emerging markets have access to derivative instruments to hedge their foreign exchange risk. Several emerging markets including Indonesia, Malaysia, Thailand, Brazil, and Chile have currency swap markets with maturities up to 5 or 10 years. In other emerging markets (e.g., Mexico, South Korea, Taiwan, and the Philippines), forward markets—the embryos of swap markets—are rapidly developing. World Bank borrowers may use a recently established scheme to improve their management of the currency and interest rate risks of their bank loans. Under the new World Bank scheme, borrowers can amend the terms of their existing currency-pool loans—currency composition and floating-rate/fixed-rate mix—to reflect their desired debt management strategy.<sup>12</sup> The scheme would allow eligible countries to restructure their external debt without using their swap credit lines with commercial banks, and at low transaction costs. The increasing sophistication of international derivative instruments expands considerably the ability of governments to hedge the risks associated with their foreign currency borrowing.<sup>13</sup> It also allows them to respond to opportunities to exploit market niches and expand their investor base—for example, to include Japanese or German retail investors—without bearing the cross yen-dollar exchange risk.

Reducing the currency risk exposure of emerging market sovereign debt and lengthening its maturity profile are medium-term strategies, and are contingent on the development of domestic capital markets and of hedging instruments denominated in the local currency. During the transition, the government's goal would be to manage its net foreign currency risk exposure effectively, so that its vulnerability to exchange rate and foreign interest rate fluctuations is bounded.

### Institutional Framework

Efficient management of the external risk exposure of sovereign liabilities requires designing institutional

<sup>12</sup>World Bank (1996a). Currency-pool loans are multicurrency obligations, with the U.S. dollar, deutsche mark, and Japanese yen accounting for at least 90 percent of the dollar value of the currency pool. The currencies are targeted until 2001 in fixed currency ratios of 1 dollar for every 125 yen and 2 deutsche mark equivalent. All currency-pool loans are made at a variable rate reflecting World Bank cost of funding.

<sup>13</sup>The ability of governments to swap their foreign currency debt may also be constrained by their credit line limits with financial institutions, as swap transactions reduce such credit lines.

arrangements that provide appropriate incentive structures for debt management, acquiring technical expertise and sophisticated information systems, and imposing strict internal management procedures. In most developing countries, it has proven difficult to create such incentive structures, attract qualified staff, acquire the technical expertise and systems, and develop the controls necessary to manage the overall sovereign risk exposure effectively.

Furthermore, in several developing countries, debt management policies lack transparency and accountability and are influenced by political considerations, rather than being guided by risk management practices. The lack of transparency and accountability allows debt managers to compromise the country's debt profile for short-term political gains by, for instance, issuing short-term debt solely because it demands lower interest rates, or borrowing in foreign currencies with low interest rates.<sup>14</sup> Although the budgetary cost can be reduced by these actions, the economic cost can be much higher and the sovereign's risk profile significantly worsened. Opaque institutional arrangements allow a policymaker with a short horizon to manipulate the structure of the public debt to his or her own benefit because the economic and political gains are immediate, while the potential costs (higher refinancing costs and higher expenditures) are transferred to the future. Investors' expectations that the risk of higher refinancing costs may lead to higher taxes or default rates, however, translate into a higher risk premium on the government debt.

The lack of transparency in debt management is further exacerbated by the fact that debt issuance is often not centralized within a single institution, but spread out among state, provincial, and local governments and parastatal institutions. In addition to confusing decision making and subjecting debt management to potential political pressures, such dispersion induces haphazard and uncoordinated borrowing, and hence an inefficient debt structure. Moreover, the exposure of the public debt to financial risks is unlikely to be assessed and hedged accurately under such a sprawling structure, thereby increasing its vulnerability to shocks.

Since the early 1990s there has been a heightened awareness among the governments of several OECD countries and some emerging markets of the importance of sovereign debt management, particularly in an environment of increasingly mobile and volatile capital flows and integrated capital markets. Several principles emerge from their experiences. First, it is preferable to separate debt management policy from monetary policy to preserve the integrity and indepen-

<sup>14</sup>Domestic debt mismanagement (excessive concentration of debt in short-term maturities, illiquid and costly debt issuance techniques, bunching of maturities) is widespread in a number of countries.

dence of the central bank. Second, it is desirable to shield debt management policy from political interference to ensure transparency and accountability in its conduct. Third, debt management can be improved if it is entrusted to portfolio managers with knowledge and experience in modern risk management techniques, and it is important to measure manager performance against a set of criteria defined by the ministry of finance. Finally, it is important to allocate sufficient resources for hiring highly qualified staff and for acquiring sophisticated systems to support them.

### Separating Debt Management from Monetary Policy

In contrast to the integrated management of assets and liabilities by corporations, which manage financial risks by matching the currency composition and maturity of their assets with those of their liabilities, the management of sovereign assets and liabilities is usually not commingled. In the majority of countries, central banks are in operational charge of assets management, while ministries of finance maintain operational authority over liabilities management. Such separation of responsibilities in managing sovereign assets and liabilities is viewed as optimal by governments because it avoids the potential conflicts of interest between monetary policy and debt management, which might otherwise compromise the independence of the central bank. To illustrate: a central bank with a dual mandate to conduct monetary policy and debt management policy may be reluctant to raise interest rates to control inflationary pressures because such a move would adversely affect its domestic liability portfolio. Or it might be tempted to manipulate financial markets to reduce the interest rates at which government debt is issued or to inflate away some of the value of nominal debt. A central bank may also be tempted to inject liquidity in the market prior to debt refinancing, or to bias the maturity structure of the debt profile according to the stance of its monetary policy.

Conflicts of interest between debt policy and monetary policy may also arise if the central bank is in charge of managing the foreign currency debt portfolio of the government. For instance, the daily management of the liquidity of the foreign currency debt in the foreign exchange market—converting foreign bond proceeds into local currency, or converting local currency funds for foreign currency debt repayments—may conflict with the intervention policy of the central bank. The central bank's sales and purchases of securities to meet foreign currency debt requirements also could be perceived by the financial markets as having a signaling effect on its exchange rate policy, thereby undermining its effectiveness.

Although separating debt policy from monetary policy is necessary to preserve the integrity of the central bank, only close coordination between the min-

istry of finance and the central bank can ensure that debt management policy is consistent with monetary policy. Without proper coordination, the participation of the treasury in the foreign exchange market may have significant monetary implications, and may be at odds with the intervention policy of the central bank. Specifically, the central bank needs to be fully informed of the daily transactions of the agency in charge of debt management, so that it can adjust its day-to-day management of liquidity and intervention policies to offset the impact of these transactions on the market. This is particularly the case when the central bank has to meet the foreign currency needs of the treasury, such as exchanging the foreign currency proceeds of an external bond issue for local currency, or converting local currency funds into foreign currency for interest or principal repayments on foreign currency debt. Full cooperation between the two institutions also demands that the central bank inform the debt manager of the composition and maturity of its reserves portfolio, and update it on a regular basis, so that the debt manager can factor it into debt management policy.

Potential conflicts of interest between monetary policy and debt policy have induced several countries to separate the two functions. In *New Zealand*, all debt management functions carried out by the central bank, as agent of the debt office, have been conducted without reference to monetary policy considerations since 1988. The New Zealand debt office makes all pricing decisions on treasury bills and government bonds, and advises the Minister of Finance on the size and structure of the domestic borrowing program. The foreign reserves of the central bank are integrated in the debt office's asset and liability management process, however. Specifically, the debt office directly finances the central bank's foreign exchange reserves by maintaining foreign currency deposits at the central bank. Under this structure, the central bank manages its net foreign exchange exposure, while the debt office fully incorporates foreign reserves in its debt management.

In *Hungary*, the Ministry of Finance took over the cost of servicing the net national foreign currency debt in early 1997. While the National Bank of Hungary will remain formally responsible for the interest payments and amortization of the foreign loans issued under its name, it will receive transfers from the ministry broadly equivalent to the cost of servicing that part of external debt in excess of the foreign exchange reserves of the central bank at end-1996. The ministry will take full control of debt management in 1999, and the central bank will act only as the agent of the ministry. The shift of responsibilities from the central bank to the ministry was deemed necessary to ensure that the monetary policy objectives of the central bank did not interfere with any of its other functions or responsibilities.

In *South Africa*, the central bank has been until recently the government's agent for marketing its debt instruments, thereby exposing monetary and debt policies to the potential tensions described earlier. After a thorough review of debt policy, the South African authorities set out a new policy framework for debt management in 1996, delegating all policy issues related to state debt management to the Department of Finance. The central bank was made accountable to the department on all matters related to debt management, and funding activities undertaken by the central bank on behalf of the government were fenced off from monetary policy operations. A high-level body comprising representatives of the finance department and the central bank was established to coordinate monetary and fiscal policy objectives.

There are instances, however, where the central bank can be in charge of managing the foreign currency government debt and the foreign exchange reserves without creating conflicts of interests. This would apply to a government that issues foreign currency debt only to finance foreign reserves. *Denmark* provides a case in point. The Danish government decided in 1991 to regroup assets and liabilities management under the central bank's authority. The rationale behind the decision was to improve coordination of the management of the public debt and foreign reserves and to reduce the net exposure of the government to exchange rate risk.<sup>15</sup> Managing the net exposure of assets and liabilities was deemed to be more appropriate than managing their isolated exposures because of the limited use of foreign currency debt in funding budget deficits. Indeed, the Danish government issues foreign-currency-denominated debt to replenish foreign reserves only when they deviate from a desired level, while only kroner-denominated debt is used to finance the government deficit. Although the central bank is in charge of managing the net portfolio, the decision on the currency composition and the desirable maturity of the net portfolio is made jointly with the Ministry of Finance and the Ministry of Economic Affairs during quarterly meetings.

In most countries, however, foreign currency debt is not issued primarily to finance foreign reserves, but to finance the fiscal deficit and the current account deficit. Under those circumstances, it is preferable to forgo the efficiency of a single agency managing the sovereign's net risk exposure to avoid conflicts of interest.

### Debt Management Framework

The separation of debt policy from monetary policy allows the central bank to fulfill its monetary objec-

<sup>15</sup> While the currency composition of the foreign debt and foreign reserves is matched, there is no immunization of interest risk.

tives unfettered by debt policy objectives. In a similar vein, an efficient, transparent, and accountable debt management policy requires an organizational structure independent from political influence, with clearly defined objectives and performance criteria, and run by qualified staff, according to sound risk management principles. A number of countries (e.g., Austria, Belgium, Ireland, New Zealand, Portugal, and Sweden) have concluded that, to achieve such objectives, debt agencies with some degree of autonomy from the political sphere should be set up. Specifically, the formulation of debt policy (e.g., level of the debt, limits on domestic and foreign currency borrowing) is a political decision and, therefore, should rest in the hands of the government. The management of the sovereign debt, however, can be extracted from the political domain and assigned to a separate and autonomous debt management office (DMO). Under this arrangement, the ministry of finance defines the medium-term strategy for debt management—based on its objectives and risk preferences, and the macroeconomic and institutional constraints of the country—while the DMO implements that strategy and administers the issuance of the domestic and foreign currency debt.

### Autonomous Debt Agencies

There are several advantages to a separate and autonomous debt management office. First, by recognizing that the structure of the sovereign debt portfolio is an integral part of public policy and deserves a distinct institutional presence, the authorities signal their commitment to a more transparent, evenhanded, and accountable debt management policy to financial markets and their political constituency. Second, an autonomous debt agency can be charged with a clearly defined objective, based on economic and market-based principles, and organized to achieve such an objective, without being hampered by either the management structure or pay scale of the public sector. In particular, an autonomous debt agency can maintain a flexible management and career path structure and link the pay scale of its personnel to that of private sector practitioners. Such a flexible pay structure would allow the DMO to attract staff qualified to manage increasingly complex financial instruments and markets. Third, a DMO perceived by investors as credibly independent from political decision making would contribute to lowering the country's risk premium and the government's borrowing costs, because it would be perceived as less likely to engage in risky strategies designed to maximize short-term political gains. The success of a DMO, however, hinges on the existence of an open and developed domestic financial system and an accountable structure within the public sector.

The main tasks of a debt agency are to manage the day-to-day risk exposure (liquidity risk, market risks)

of the sovereign debt portfolio and to ensure that the sovereign borrower has continuous and orderly access to international financial markets to meet its external obligations. In addition, the debt agency typically manages the domestic public debt portfolio. This entails managing liquidity risk by ensuring that future funding needs can always be met at the lowest cost and are smoothly spread over a number of years without significant repayments bunched in single periods. DMOs can also enhance the liquidity of the government securities market by increasing the transparency and predictability of debt issuance and creating liquid benchmark issues spread along the yield curve.<sup>16</sup> Greater transparency can be attained by planning and reporting in advance the financing requirements of the government, the maturity structure of future borrowing, and the auction dates of domestic debt issuance for the financial year. Greater predictability can be achieved by relying on regular and nondiscretionary debt issuance, primarily through auctions. By increasing liquidity and attracting a larger investor base, the DMO will help to reduce borrowing costs.

Sovereign risk exposure is not limited to government debt but characterizes debt contracted by all public and publicly guaranteed entities (provincial, state, or local governments, parastatals, and all other debt with a government's guarantee). Most governments, however, exclude publicly guaranteed debt from their debt management policies until the guarantees are invoked, and hence do not accurately reflect the risk profile of the sovereign. It is therefore important that all public debt be centralized under the management structure of the DMO and managed as a single portfolio.

### *Selected Examples of Debt Management Offices*

Autonomous debt management offices have been established by law in a number of OECD countries, including Austria, Ireland, Portugal, and Sweden (Tables 66–69). Debt agencies were set up to improve the management of the public debt by hiring qualified portfolio managers, incorporating modern risk management techniques in debt strategies, and providing a greater incentive for the staff to lower borrowing costs. Although these DMOs report to their ministries of finance, they maintain a significant degree of autonomy from the latter, have their own boards of directors, follow specific investment guidelines against which their performance is evaluated, and remunerate their staff competitively. Denmark, Finland, and the Netherlands also grant their debt offices a degree of autonomy from the political process; Australia, New Zealand, and to a limited degree Denmark have spe-

cific performance criteria for their debt agencies.<sup>17</sup> Selected debt offices that have recently been established or reformed are surveyed below.

In *Ireland*, the government delegated in 1990 the borrowing and debt management functions of the department of finance and the domestic government bond market operations of the central bank to an autonomous debt agency, the National Treasury Management Agency (NTMA). The decision to establish the NTMA was justified on the grounds that it would be given clearly defined performance objectives and a degree of independence from other government objectives, and that the concentration of resources and expertise would result in better risk management and lower debt-servicing costs. The agency's main objective, which is cast with reference to a low-risk, medium-term benchmark portfolio, is to fund maturing government debt and annual borrowing requirements at a lower cost than that of the benchmark portfolio, while containing the volatility of annual fiscal debt-service costs.

In 1989, *Sweden's* National Debt Office (SNDO), which was founded in the eighteenth century, was transferred from the authority of the Parliament to that of the Ministry of Finance to improve debt management practices. The primary objective of the SNDO is to minimize the costs of borrowing within the limits imposed by monetary policy and to finance the day-to-day government budget deficit at the minimum possible long-term cost. The board of the SNDO—which is composed of, among others, the undersecretary of the Ministry of Finance and members of Parliament—establishes separate benchmark portfolios for the domestic and foreign currency debt and lays down the permitted deviations from the benchmark portfolios. Within these broad guidelines, the SNDO manages currency allocation and the maturity structure and market risk of the overall debt portfolio. The performance of the SNDO is evaluated by comparing the cost of the central government debt with that of the benchmark portfolio for the fiscal year.

The performance of the SNDO, which is reviewed by the board on a quarterly basis, has been remarkable over the past four years. Between July 1991 and June 1995, the overall savings on both the kronor debt and the foreign currency debt, relative to the benchmark portfolios, amounted to about 16 billion kronor. During that period, the SNDO also outperformed external managers, who are responsible for managing a small portion of the foreign currency debt on the same principles as those of the SNDO. Between January 1992 and July 1995, the funding costs of the external managers were 0.9 percentage point higher than the corre-

<sup>16</sup>When used in the context of domestic debt, a *benchmark* refers to a large and liquid debt security against which other debt securities (e.g., corporate, state enterprise) are measured and priced.

<sup>17</sup>Typically, performance criteria are attached only to how efficiently funding transactions are executed and do not cover other debt management functions (e.g., liquidity management, risk management).



**Table 66. Institutional Structure of Debt Offices in OECD Countries: Debt Offices Within the Treasury**

	Australia	Belgium	Netherlands	New Zealand	Turkey
1.1 Position of debt management office (DMO) in government organizations.	Branch of treasury.	Treasury.	Agency in treasury.	Branch of the treasury.	General directorate in treasury.
1.2 Chief executive officer reports to:	Treasurer.	MoF.	Treasurer.	MoF.	The undersecretary and the minister.
1.3 Board of directors.	No.	No.	No.	Advisory board.	No.
1.4 Degree of independence from political power.	Highly independent.	Not independent.	Independent.	No specific independence.	Independent under normal circumstances.
2.1 Does the DMO have specific performance criteria?	Yes, both for long-term and operational performance.	No specific criteria.	General criteria for the maturity and the cost of borrowing.	Qualitative performance criteria relating to all services.	No.
2.2 Who evaluates the performance criteria?	DMO.	No specific evaluation.	Parliament.	Secretary of treasury.	...
2.3 Is there a penalty in case of a loss?	No.	No.	...	...	...
3.1 Is there a legal limit for domestic borrowing?	Yes, financial year budgetary need.	Yes, limit on the cost of borrowing.	Only an implicit limit (budgeted borrowing requirement).	No legal limit.	Only for government bonds; the limit is twice the budget deficit.
3.2 Who decides on the new limits?	DMO and the treasurer.	Parliament.	...	MoF may alter the program.	For government bonds, the parliament.
4.1 Who makes the final decision in an auction?	Treasury.	MoF.	Agent (chief executive of DMO).	DMO.	The undersecretary of treasury.
5.1 Involvement of DMO with cash management budget office.	Closely related.	Closely related.	Closely related.	Carried out by DMO. Closely related.	Direct involvement.

6.1 Duties other than debt management (in case of a crisis).	Political authority is needed for a direct offshore issuance.	In a foreign exchange market crisis, may implement special issues with suitable terms.	To suspend or withdraw an announced issue after consultation with treasurer.	None.	In consensus with monetary policy, may become an effective instrument to handle the crisis.
7.1 Comparative wage of a DMO officer.	Equivalent to civil servant, marginally lower than central bank officer.	Equivalent to civil servant, lower than private bank officer.	Equivalent to civil servant, lower than private bank officer.	Comparable to civil servant, comparable to bank officer.	Equivalent to civil servant, lower than private bank officer.
8.1 Fiscal agent.	Reserve Bank of Australia (central bank).	National Bank of Belgium and financial intermediaries.	Agency in treasury.	Registry, Reserve Bank of New Zealand (central bank).	Central bank.
8.2 Agency services.	. . .	Collecting the coupons and debiting the treasury account.	Handling the mechanics of sales.	Money collection, issuance, payments, and registration.	Handling auctions, bond sales on tap, redemptions and interest payments, and deposit account record keeping.
9.1 Size of book-entry form stock.	More than 90 percent.	All treasury certificates and part of other public loans.	3 percent.	100 percent.	0 percent.
9.2 Number of track-keeping staff.	Five treasury officers for book-entry, 25 central bank staff for all areas of registry.	All treasury certificates and part of other public loans (17 persons).	One person.	Twenty-nine staff.	Twenty treasury officers.
10.1 Who handles the statistical followup and projection?	Debt management branch of the treasury.	Public debt office in the treasury.	Financial reporting and computer programming department of the agency.	. . .	Budget and domestic department provisions in treasury.
11.1 Basis of accounting.	Cash basis for budget accounts; accrual basis for financial statements.	. . .	Cash and accrual basis.	Cash accrual and marked-to-market basis.	Cash basis for budgetary purposes; accrual basis for following up the stock.

Source: Organization for Economic Cooperation and Development.  
Note: DMO = debt management office; MoF = ministry of finance.

**Table 67. Institutional Structure of Debt Offices in OECD Countries: Autonomous Debt Offices**

	Austria	Ireland	Sweden
1.1 Position of debt management office (DMO) in government organizations.	Autonomous corporate body owned by MoF (AFFA).	Autonomous agency under the MoF.	Autonomous agency under the MoF.
1.2 Chief executive officer reports to:	MoF.	MoF.	...
1.3 Board of directors.	Yes.	Advisory committee.	Yes.
1.4 Degree of independence from political power.	Highly independent.	Independent in some broad guidelines drawn by MoF.	Independent except for volume of foreign currency borrowing.
2.1 Does the DMO have specific performance criteria?	No specific criteria.	Yes.	<ul style="list-style-type: none"> <li>• For foreign exchange funding.</li> <li>• For domestic funding.</li> </ul>
2.2 Who evaluates the performance criteria?	...	J.P. Morgan evaluates and reports to MoF.	Board of directors and MoF.
2.3 Is there a penalty in case of a loss?	...	No.	There is a limit only for foreign exchange funding.
3.1 Is there a legal limit for domestic borrowing?	Yes, the limit is set by the Financial Law.	No.	There is a limit only for foreign exchange funding.
3.2 Who decides on the new limits?	Parliament.	...	...
4.1 Who makes the final decision in an auction?	AFFA (DMO).	Officials in charge of market operations.	Officer in charge of auctions.
5.1 Involvement of DMO with cash management budget office.	Closely related.	Closely related. Takes the broad parameters.	Taken for granted.
6.1 Duties other than debt management (in case of a crisis).	On request of MoF, gives opinion on budget financing.	No special duties other than taking part in the advisory committee.	Must act parallel to the monetary policy (especially in foreign exchange crisis).
7.1 Comparative wage of a DMO officer.	Higher than civil servant, comparable to bank officer.	Higher than civil servant.	Higher than civil servant, lower than private bank officer.
8.1 Fiscal agent.	Postal savings bank. Also for cash management, other private banks.	Agency, except for the settlement of government bond transactions.	Swedish Central Securities Depository (VPC) in domestic currency.
8.2 Agency services.	...	...	Redemption of loans; payments of coupons.
9.1 Size of book-entry form stock.	73 percent.	100 percent.	100 percent till 1993.
9.2 Number of track-keeping staff.	Two officers.	Six officers and 15 central bank staff.	Swedish Central Securities and one person in debt office.
10.1 Who handles the statistical followup and projection?	MoF.	Department of finance.	Debt office.
11.1 Basis of accounting.	...	Cash basis for the most part; accrual basis for the administrative budget.	Cash basis supplemented by cost accounting.

Source: Organization for Economic Cooperation and Development (OECD).

Note: DMO = debt management office; MoF = ministry of finance.

**Table 68. Institutional Structure of Debt Offices in OECD Countries: Debt Offices Within the Central Bank**

	Denmark	United Kingdom
1.1 Position of debt management office (DMO) in government organizations.	Denmarks Nationalbank (central bank).	Treasury and Bank of England.
1.2 Chief executive officer reports to:	MoF.	Treasury minister.
1.3 Board of directors.	No.	No.
1.4 Degree of independence from political power.	Borrowing program is approved by the MoF.	Independent within the limits set by the remit.
2.1 Does the DMO have specific performance criteria?	Only foreign currency portfolio is subject to evaluation.	Performance against the remit.
2.2 Who evaluates the performance criteria?	MoF.	Ministers.
2.3 Is there a penalty in case of a loss?	No.	...
3.1 Is there a legal limit for domestic borrowing?	Yes, limit on the level of debt outstanding.	Yes, limit by the funding remit.
3.2 Who decides on the new limits?	Parliament.	...
4.1 Who makes the final decision in the auction?	Denmarks Nationalbank.	Bank of England.
5.1 Involvement of DMO with cash management budget office.	Active involvement.	Closely related.
6.1 Duties other than debt management (in case of a crisis).	With the consensus of the bank and MoF, debt management may become an instrument in handling the crisis.	Money markets and foreign exchange and reserve management.
7.1 Comparative wage of a DMO officer.	Comparable to civil servant, lower than bank officer.	Comparable to civil servant, lower than private bank officer.
8.1 Fiscal agent.	Denmarks Nationalbank.	Bank of England.
8.2 Agency services.	...	Advising treasury in timing of sales, and deciding the acceptable price level of bids for stock.
9.1 Size of book-entry form stock.	Nearly 100 percent.	90 percent (optional).
9.2 Number of track-keeping staff.	Staff of 120 in Danish Securities Center (independent institution).	...
10.1 Who handles the statistical followup and projection?	Denmarks Nationalbank.	Treasury for projections; bank's Financial Statistical Division; government's Central Statistical Office.
11.1 Basis of accounting.	Cash basis.	Cash and accrual basis for calendar and fiscal year.

Source: Organization for Economic Cooperation and Development.

Note: DMO = debt management office; MoF = ministry of finance.

**Table 69. Institutional Structure of Debt Offices in OECD Countries: Debt Offices Within the Ministry of Finance**

	Canada	Germany	Greece	Japan	Mexico	Switzerland
1.1 Position of debt management office (DMO) in government organizations.	Department in MoF.	Directorate in MoF.	MoF.	Department in MoF.	Directorate in MoF.	Unit in MoF.
1.2 Chief executive officer reports to:	MoF.	MoF.	...	MoF, the government.	General director, MoF.	MoF.
1.3 Board of directors.	No.	No.	...	No.	No.	Monitoring committee.
1.4 Degree of independence from political power.	...	Independent except for important matters.	...	Dependent.	Independent within the broad objectives of the Development Plan.	Independent with some restrictions.
2.1 Does the DMO have specific performance criteria?	No.	No specific criteria.	...	No formal criteria.	A general (flexible) performance criterion.	No specific criteria.
2.2 Who evaluates the performance criteria?	...	...	...	...	Undersecretary.	...
2.3 Is there a penalty in case of a loss?	...	...	...	...	The director of public debt is responsible.	...
3.1 Is there a legal limit for domestic borrowing?	Yes, Borrowing Authority Act.	Yes, a limit is set by federal legislative authorizations (Budget Law).	No, except for the limit on treasury bill issues.	Yes, a limit is set by Budget Law.	Yes, a limit is set according to the federal budget.	No legal limit.
3.2 Who decides on the new limits?	Parliament.	Parliament.	Interest rates are set by MoF; amount is determined by subscription in the market.	The Diet (legislative branch of parliament).	Congress.	...
4.1 Who makes the final decision in an auction?	Department in MoF.	Division state secretary or MoF according to the implications.	...	Minister of finance.	General director and undersecretary.	Debt management unit.
5.1 Involvement of DMO with cash management budget office.	...	...	...	Related within the MoF.	Closely related.	Active involvement.

6.1	Duties other than debt management (in case of a crisis).	...	In situations with political implications may behave according to the decision of MoF in cooperation with Bundesbank or the cabinet.	...	None.	Government economic cabinet board decides what to do.	Management of assets, interest rates, and currency risk hedging.
7.1	Comparative wage of a DMO officer.	...	Equivalent to civil servant; difficult to compare with bank officer.	...	Equivalent to civil servant, lower than private bank officer.	Equivalent to civil servant, lower than private bank officer.	Equivalent to civil servant, lower than private bank officer.
8.1	Fiscal agent.	Bank of Canada.	German Bundesbank.	...	Bank of Japan (central bank).	Any private bank, usually Citibank.	Swiss National Bank.
8.2	Agency services.	Advising, recordkeeping, issuing, redeeming, international payment registration, and deposit accounts.	Lead manager in bond syndicate; tender procedures/auctions; support and smoothing operations in the secondary market.	...	Issuing, auction handling, redemption, international payment, registration.	Issuing in international capital markets.	Being counterparty in money market; functioning as custodians; handling auctions; collecting stamp duty.
9.1	Size of book-entry form stock.	More than 90 percent.	Nearly 100 percent.	0 percent.	98 percent.	Approximately 40 percent.	2.5 percent of bonds and 96.5 percent of short-term papers.
9.2	Number of track-keeping staff.	CDS staff (privately owned nonprofit institution).	Staff of 235 in federal debt administration (independent institute).	...	Twenty-five staff.	Twelve staff.	Four people in accounts department of treasury.
10.1	Who handles the statistical followup and projection?	Bank of Canada.	Division of federal government debt.	MoF.	Government debt division for statistical followup; budget bureau for projections.	(Domestic debt) director of public debt, general director of finance projections, treasury department, central bank general director of government accounting.	Financial plan and budget division and treasury back office.
11.1	Basis of accounting.	Cash basis.	Cash or accrual according to the statistical purpose.	...	Cash basis.	Real (cash basis).	Cash basis.

Source: Organization for Economic Cooperation and Development.

Note: CDS = Canadian depositories for securities; DMO = debt management office; MoF = ministry of finance.

sponding costs of the benchmark portfolio, whereas the SNDO's costs during the same period were 2.5 percentage points lower than those of the benchmark portfolio (Sweden, National Debt Office, 1995).

In *New Zealand*, the country's debt management strategy is implemented through the New Zealand Debt Management Office (NZDMO), which has been responsible for managing the public debt since debt management policy became disentangled from monetary policy objectives in 1988. Although the NZDMO has been placed in a division of the Treasury, it maintains some degree of autonomy from the rest of the government, and has its own advisory board. The board meets four times a year and includes, among others, a senior member of the Treasury and experts in risk management theory and practice. The role of the board is to provide advice and oversight across a broad range of strategic and operational risk management issues and to promote transparency in DMO decision making and supervision. The treasurer or head of the NZDMO recommends the strategic benchmark for the sovereign debt, in terms of currency mix and interest rate sensitivity, and the tactical trading limits imposed on the portfolio manager.<sup>18</sup> Both of these parameters have to be approved by the New Zealand Treasurer.

The objective of the NZDMO is "to identify a low risk portfolio of net liabilities consistent with the Government's aversion to risk, having regard for the expected costs of reducing risk, and to transact in an efficient manner to achieve and maintain that portfolio." In order to minimize its net risk exposure, the NZDMO has gradually set the duration and currency profile of its liabilities to match that of its assets. As most of the government assets are denominated in New Zealand dollars, this strategy has entailed a gradual elimination of the net public foreign currency debt—which was achieved in September 1996—and a lengthening of the duration of the domestic public debt. A significant change introduced by the NZDMO is the marking to market of all its financial liabilities on a daily basis; it has incorporated other private sector risk management practices in its debt management as well. The performance of the portfolio managers is measured on a daily basis by comparing the market value of the actual debt portfolio with the strategic benchmark portfolio.

In the past two years, a small number of emerging market countries have also reformed their debt management practices and introduced benchmarks for their external debt. In *Colombia*, the Ministry of Finance and Public Credit has implemented a series of measures to strengthen its liability management framework. The measures include increasing the staff in charge of managing and hedging its external debt

<sup>18</sup>In view of the small amount of risk that the NDZMO is allowed to take, the position limits around the strategic benchmark portfolio are tightly defined.

portfolio, modernizing the data systems supporting the staff, and consolidating the external borrowing strategies of the central government and the parastatal companies. Particular attention has been paid to attracting staff with the appropriate knowledge and experience in portfolio analysis and to offering competitive remuneration to retain them. The main reform introduced by the authorities is managing the sovereign liability portfolio with respect to a set of low-risk benchmark parameters specifying exchange rate, liquidity, and interest rate risks.

In *Hungary*, as noted earlier, the debt management office located in the Ministry of Finance has been charged with servicing the cost of the net sovereign foreign debt. The authorities have decided to align the currency composition of the foreign currency debt through hedging operations with that of the currency basket to which the national currency is pegged. Particular emphasis is being placed on lengthening the maturity of the debt, maintaining more than three-quarters of the debt in fixed-rate instruments, and evenly spreading debt redemptions to avoid rollover risks.

Although several other emerging market countries, including Argentina, Mexico, South Africa, and Turkey, are currently reviewing their debt management practices, in most developing countries debt offices are nonexistent, debt management objectives are cast in general terms, and there are no formal guidelines on the currency composition and maturity structure of the public debt.

## Strategic Management of Sovereign Liabilities

### Benchmarks for the Foreign Currency Debt Portfolio

A key building block in the institutional framework of sovereign risk management is the derivation of a benchmark or target portfolio for the external public debt.<sup>19</sup> A benchmark communicates the medium-term policy objectives of the policymaker to the portfolio manager and the framework within which he or she has to operate; it also provides a measure against which the performance of the manager can be evaluated. Devising a benchmark for the external public debt encourages policymakers to articulate and quantify their key objectives and cost/risk trade-offs, and to

<sup>19</sup>Benchmarks are most useful for the foreign currency debt portfolio. It is difficult to have a benchmark portfolio in the domestic market because the government is the largest borrower, and its securities act as benchmarks against which all other instruments are priced and measured. The government may have, however, a target domestic debt portfolio, specified in terms of duration; the target portfolio should serve as a reference point rather than as a benchmark to beat.

measure the currency, interest rate, liquidity, and credit risks that they are willing to tolerate on the portfolio. In essence, the establishment of a benchmark imposes discipline on the debt management policies of the sovereign borrower.

The selection of a benchmark for the external debt entails specifying the desired currency composition of the debt and, for each of the currencies, specifying the target duration, the maximum maturity, the breakdown between fixed- and floating-rate instruments, and the financial instruments permitted in the portfolio (e.g., bank loans, indexed-linked bonds, derivatives). Identifying and quantifying these factors is a challenging process, because they depend on the objectives and risk preferences of the policymaker and the macroeconomic and institutional constraints faced by the country. The composition of a benchmark is also strongly influenced by the numeraire in which costs are measured and the horizon over which such costs are estimated.

### Objectives

Debt management objectives vary from one country to another, but in most instances they focus solely on lowering annual budget costs rather than on lowering the long-term economic cost of public debt. In recent years, however, a growing number of governments (e.g., Australia, Belgium, Sweden) have redefined their debt management objectives as minimizing the financial, long-term cost of public debt, not just budgetary costs.<sup>20</sup> In Belgium, the objective of public debt management is “to minimize the financial cost of the public debt, while maintaining market and operational risks at an acceptable level, taking into account the general objectives of budgetary and monetary policies.” In Australia, the debt management objective is to minimize the long-term portfolio cost, defined as the time-weighted total debt cost (economic cost), subject to an acceptable level of risk, defined in terms of the annual debt-servicing costs (accounting measure of risk). Similarly, in Sweden, the overriding objective of the debt office is to minimize the costs of public debt within the limits imposed by monetary policy.

In setting such objectives, governments face a trade-off between minimizing the budget cost of the public debt and lowering the volatility of debt-servicing costs. The extent to which sovereign borrowers place greater emphasis on the first or second of these objectives has a significant impact on the target maturity of the benchmark and on the proportion of fixed- versus floating-rate instruments in the portfolio.

For instance, if the government’s main objective is to lower debt-service costs, the target duration of the

benchmark portfolio would be short (assuming an upward yield curve) and biased toward issuing short-term or floating-rate instruments. A short-duration debt, however, has to be refinanced more frequently, thus exposing the portfolio to greater repricing risk (refinancing at a higher interest rate) or bunching risk (repayment of principal occurring within a short period). As mentioned earlier, the Mexican crisis illustrated the risks of a short-duration public debt.

If the government’s main objective is to stabilize debt-servicing costs, the target duration of the benchmark would be longer and biased toward issuing long-term fixed-rate debt. In this case, although annual debt servicing volatility would be lower, the mark-to-market value of the debt would be more sensitive to interest rate movements. The Irish debt benchmark portfolio, for instance, has a long maturity profile, reflecting the government’s bias toward debt-servicing stability. If the objective of the government is to minimize the volatility of the net present value of the debt on a year-to-year basis (a one-year time horizon), then a debt with a maturity of one year would minimize risk.

### Risks

The key question to address when selecting the composition of the benchmark is the extent of risks (liquidity, market, credit) or losses that the policymaker is willing to tolerate. The risk tolerance of the sovereign may prove tricky to estimate, however, because there is no single measure of sovereign risk. Wheeler (forthcoming) recommends that the government align its risk preferences with those of the average or median citizen, who is typically risk averse. Indeed, since taxpayers cannot fully hedge or avoid the losses that the government incurs on its assets and liabilities portfolios, they would demand that the government follow a low-risk strategy. The risk preferences of a sovereign entity can also be approximated by taking those of institutions with a similar risk profile, such as pension funds, international financial institutions, life insurance companies, and long-term savings industries. A more systematic estimation of risk tolerance, however, would be to define it in terms of the maximum interest rate costs and excess volatility that can be sustained on the debt portfolio without jeopardizing the budget targets and medium-term objectives of the government. Any risk exceeding this tolerance level should be avoided.

The risk tolerance of a government ultimately depends on the size of the public debt, its currency composition, and its maturity. Any time the debt-service cost is an important element in government expenditures, its variation becomes a key element to watch, and the sovereign borrower is likely to be concerned with the volatility of its debt. This is particularly the case for governments that have a limited ability to

<sup>20</sup>The optimal level of the debt is a fiscal decision that is taken as given in the analysis.



generate foreign currency revenues or to access international markets. When the debt-to-GDP ratio is low, however, the sovereign has greater flexibility in terms of the choice of currencies in its portfolio and its duration. In particular, the sovereign borrower may diversify its portfolio to include currencies with lower yield, or shorten the maturity of its portfolio to reduce interest rate costs, knowing that its overall exposure to the higher risks is limited.

### Macroeconomic Constraints

The two key macroeconomic policies that affect the currency composition and maturity profile of the external debt benchmark are the fiscal and monetary policies of the government. Budget targets, for instance, influence the desired duration of the benchmark. Budget targets may include maintaining the level of public debt to GDP below a certain percentage (e.g., to meet Maastricht criteria); reducing the government debt as a percentage of GDP over a certain horizon; or maintaining the public deficit below a certain percentage of GDP (e.g., stability pact after EMU). A cap on the debt-to-GDP ratio constrains the extent of volatility tolerated on the debt portfolio and biases the portfolio toward a longer duration. A cap on the budget deficit or on interest payments imposes a minimum average maturity on the portfolio, and constrains the proportion of floating-rate debt, thereby limiting the risks of interest rate and exchange rate shocks destabilizing the budget targets.

A monetary policy geared toward pegging the exchange rate to a currency or a basket of currencies (1) biases the choice of currencies in the benchmark portfolio toward the pegged currency (e.g., as in Hungary), and (2) limits the proportion of floating-rate and short-term domestic debt in the portfolio (e.g., as in Belgium), to allow the central bank greater flexibility in influencing short-term rates through open market operations. The incompatibility of a pegged exchange rate policy with a short-duration domestic debt was demonstrated during the 1992 ERM crisis. Several European central banks were constrained in their defense of their exchange rates during the crisis by the short duration of the public debt: both Italy and Spain had difficulty raising interest rates because of the short duration of their debt and the rapid impact of the higher rates on public expenditures. In countries in which a large portion of the debt is at floating rates, monetary policy would also be constrained by the pass-through of interest rate hikes to domestic borrowers (e.g., the United Kingdom during the ERM crisis).

The trade flows of a country may also influence the choice of currencies in the external public debt benchmark, particularly when trade flows dominate capital flows, or when a government's revenues are directly linked to the export of commodities denominated in foreign currencies (e.g., Colombia, Mexico, Saudi

Arabia). In economies in which the exchange rate is determined by monetary policy and capital flows, rather than by trade flows, the latter need not determine the foreign currency composition of the benchmark. The governments of several industrial countries with debt benchmarks (e.g., Belgium, Denmark, Ireland) do not take trade flows into account when deciding on the target currency composition of their benchmarks; they expect currency hedging to be undertaken by private entities and corporations.

### Institutional Constraints

An important institutional constraint that affects the target currency composition and duration of the benchmark is the extent of official borrowing (bilateral or multilateral) in the foreign currency debt portfolio, since official borrowing is generally denominated in the donors' currencies. Indeed, as more than half of developing countries' long-term debt is owed to official creditors, a significant part of the debt may be denominated in currencies that are not optimal from a risk management perspective. When developing countries have access to derivative markets or to the World Bank currency conversion scheme discussed earlier, they can hedge their exposure to some of these currencies.

Other institutional constraints that influence the composition benchmark include limiting the currency composition of the foreign debt to that of the foreign reserves portfolio (e.g., United Kingdom); maintaining a fixed percentage of foreign borrowing in a specific currency such as the ECU to develop the debt market of that currency (e.g., France, Italy); or partly aligning the currency composition of the external debt with that of the national foreign assets (e.g., oil stabilization fund in Colombia) to create a natural hedge. National assets are often designated for special purposes, however, and may not necessarily be at the disposal of the sovereign to service its foreign debt.

### Numeraire and Horizon

The choice of a numeraire in which costs are measured is particularly important as it biases the currency composition of the portfolio toward that currency. Considering that the assets and revenues of most governments are denominated in the local currency, it would seem appropriate to measure the liabilities and interest payments of the government in the same currency; the risk-neutral numeraire for a sovereign portfolio is therefore the local currency.<sup>21</sup> The local cur-

<sup>21</sup>Belgium, Denmark, Ireland, and New Zealand, among others, use their local currency as the numeraire for their foreign currency debt. In Colombia, the dollar is used as numeraire, as the closest substitute to the peso, owing to its importance in trade and capital flows and exchange rate management.

rency could be taken as the numeraire even when a country pegs its exchange rate to another currency or to a basket of currencies. Taking the pegged exchange rate as the numeraire would give the sovereign only a nominal hedge against currency risk, because there is always a risk that the currency will be devalued or the peg abandoned.

To avoid frequent changes in its composition and maintain its neutrality from political considerations (budget cycle) a benchmark needs to be defined over a medium-term horizon (e.g., three to five years).

### Analytical Framework

Having identified its objectives, risk preferences, and constraints, the policymaker then has to choose an appropriate analytical framework to model the stochastic properties of the variables involved and derive the benchmark debt portfolio. There is no unique methodology that can be used to derive a benchmark portfolio. Efficiency frontier models, which estimate the cost/risk characteristics of various currencies and interest rates in a portfolio, have been used by a number of countries (e.g., Belgium, Ireland, and New Zealand) to derive their benchmarks. Drawing the most efficient combination of expected costs, variances, and correlations for the different currencies and interest rates, the analyst obtains an efficiency frontier—representing a set of portfolios that offer the lowest expected cost for a given level of risk.<sup>22</sup> The most conservative approach is to choose, among these portfolios, the minimum variance portfolio—the portfolio that yields the lowest costs at the minimum level of risk—as the benchmark portfolio.

The success of a benchmark as a risk management tool is closely linked to its robustness to changes in its underlying assumptions, including various financial market outcomes or interest rates and exchange rate scenarios. Robustness can be assessed by comparing the performance of the benchmark under various price movements—for example, lower and higher interest rates, a flattening or a steepening of the yield curve, and an appreciation or depreciation of the domestic currency vis-à-vis the foreign currencies included in the portfolio. Given that debt management includes managing the exposure of the sovereign borrower to low-probability, high-risk events, the robustness of the benchmark to extreme market conditions (tail events) also has to be tested. This can be done by simulating the effect of market collapses, sharp changes in exchange rates (the ERM crisis, the Mexican crisis), in-

<sup>22</sup>Expected returns are implied from forward exchange rates, swap curves, and the interest rate term structure, whereas variances and correlations are derived from historical data. In order to be risk-neutral, benchmarks should rely on expectations derived from market prices rather than on the government's forecasts of foreign currencies and interest rates.

terest rates, or commodity prices (oil shock) on the benchmark.<sup>23</sup> The benchmark would be robust if, under all scenarios, its risk-adjusted cost performance is superior to all other portfolios. Depending on the results of the tests, the benchmark may have to be readjusted to reflect the risk tolerance of the sovereign to catastrophic events.

A benchmark is especially effective as a disciplinary tool when its composition and the performance of the debt manager relative to the benchmark are made public. Such public disclosure is essential for creating a transparent and accountable debt management policy. In order to be used by policymakers to monitor the performance of their debt managers, a benchmark portfolio needs to be easily replicated in the marketplace as a low-cost passive strategy and structured to track available bond and money market indices (e.g., the J.P. Morgan or Salomon Brothers Money Market and Government Bond indices). A benchmark that includes complex currency or interest rate hedging strategies may be difficult and costly to replicate by the portfolio manager because of a lack of information on the instruments or high transaction costs. Finally, the composition of the benchmark needs to be reviewed regularly to incorporate important changes in the objectives and risk preferences of the government.

### Selected Examples of Debt Benchmarks

A number of countries have developed benchmarks for their public debt. In *Ireland*, the benchmark is designed to be consistent with the annual debt-service budget within which the NTMA has to operate. As such, the review of the benchmark is annual and matches the budget cycle. The NTMA attempts to beat the benchmark both by funding at different dates than the benchmark, in order to take advantage of favorable market opportunities, and by issuing at different maturities. The NTMA chooses its maturities subject to a limit on the amount of debt it is permitted to issue and subject to guidelines on the proportions of foreign currency and floating-rate debt. The performance of the DMO is evaluated by comparing the difference between the actual and benchmark portfolios at the end of the year, both of which are marked-to-market and net present valued in local currency. Although the currency composition and duration of the Irish benchmark are not made public, the deviations of the actual portfolio from the benchmark tend to be small. According to the NTMA, as of December 1996, the foreign currency composition of the Irish debt was as follows: 29 percent in deutsche mark, Dutch guilders,

<sup>23</sup>Stress tests can be simulated by adding standard deviation shifts to the parameters used in estimating the portfolio (e.g., adding one or two deviations to the currency and interest forward or swap rates), or by assigning probabilities to future market scenarios.

and Swiss francs, 43 percent in pounds sterling and French francs, 20 percent in U.S. dollars, 3 percent in ECUs, and 5 percent in Japanese yen and other currencies.

In *Sweden*, the benchmark serves as the limit within which the foreign currency debt may be exposed to currency and interest rate risks. Within the risk limits laid down by its board, the SNDO takes positions in the foreign exchange and bond markets to bring the long-term cost of the debt below that of the benchmark portfolio. As of December 1996, the currency composition of the Swedish benchmark was 25 percent deutsche mark, 16 percent French francs, 12 percent U.S. dollars, 10 percent pounds sterling, 6 percent Japanese yen, and the rest in ECUs and ECU-basket currencies. The currency composition of the benchmark primarily matches the weights of the currencies in the ECU basket (82 percent), while the U.S. dollar and Japanese yen are included in the portfolio for diversification. The duration of the foreign currency debt portfolio is around 2.2 years. The interest rate structure of the benchmark is based on diversified borrowing along the yield curve to reduce shocks to specific parts of the yield curve and to reduce bunching risk over a certain year.

In *Colombia*, the recently established external debt benchmark includes a higher portion of dollar debt than currently (80–85 percent instead of the current 72 percent), in line with the currency exposure of government revenues. The rest of the portfolio is to be divided between deutsche marks (around 12 percent) and Japanese yen (around 3 percent). The selection of the benchmark reflects the structure of currency flows into the country and the risk tolerance of the government. The benchmark portfolio has a longer maturity profile and a smaller share of floating-rate debt than the actual external debt portfolio.

In *Hungary*, the currency benchmark for the foreign currency debt (foreign and domestic) that is now serviced by the Ministry of Finance matches the composition of the basket to which the national currency is pegged (70 percent deutsche mark, 30 percent U.S. dollar). The composition of the remaining foreign currency debt held by the central bank, however, matches that of the foreign exchange reserves. These examples notwithstanding, in most developing countries, benchmarks for the external public debt remain nonexistent.

### Deviations from the Benchmark Portfolio

Sound risk management would necessarily require that, at times, the debt manager moves the actual debt portfolio away from the benchmark portfolio to adjust to changes in market conditions or incorporate new expectations about market developments. As any divergence from the strategic benchmark portfolio introduces currency and interest rate risks, however, the

ministry of finance would need to cap those risks by imposing strict guidelines on the maximum permissible deviation from the benchmark and the extent to which the sovereign portfolio may be exposed to market risks.

The discretion of debt managers over the management of the sovereign debt varies from one country to another, depending on the risk preferences of the sovereign borrower, the size of the debt, and the expertise of portfolio managers. A government burdened with a large debt-service cost relative to its budgetary expenditure would necessarily limit the extent to which debt managers can deviate from the benchmark portfolio, because of the large fiscal consequences of a risky strategy. This would apply, for example, to a country that wants to join EMU and thus has to abide by Maastricht criteria. In such instances, the debt manager would follow a passive investment strategy, ensuring that the actual debt portfolio follows the benchmark portfolio closely. Governments with a small debt burden and the means to acquire sophisticated risk management systems and experienced portfolio managers have greater flexibility in allowing their debt managers to pursue an active debt management strategy. For instance, debt managers may be encouraged to outperform the benchmark by deviating from the benchmark's currency weights and duration by a certain percentage, according to their expectations of future market movements. Active debt management may also involve taking advantage of arbitrage opportunities and irregularities in the market, through liquidity or credit transformation transactions.

In Denmark, the maximum level of deviation from the benchmark has been set at DKr 2.5 billion in each country. In Sweden, the SNDO may deviate from the currency composition of the debt benchmark portfolio by 3 percentage points, and by 0.5 percentage point from the duration of the benchmark. In Belgium, the government has opted to pursue a passive debt management strategy because of the high operational costs of active management. Canada has also renounced an active debt management policy and focuses only on minimizing refunding risks.

### Conclusion

In a world of mobile capital flows and integrated capital markets, governments holding large and unhedged foreign currency liabilities may be exposed to risks that they are not always fully equipped to manage properly. In the current environment, the sound management of sovereign liabilities has become an important element of a country's ability to safeguard its exposure to external risks.

An important step toward reducing the vulnerability of emerging markets to external shocks is to reform the institutional arrangement governing debt

policy, so that it promotes a professional, transparent, and publicly accountable incentive structure. The experience of the governments that have already reformed their debt management practices suggests that such objectives are best achieved if debt management is assigned to a separate debt agency with a degree of autonomy from political influence. Under such an arrangement, the ministry of finance formulates and publicly announces its debt strategy, while the debt agency implements that strategy and manages the day-to-day exposure of the debt portfolio according to the investment guidelines of the ministry of finance.

Regrouping liabilities management under a separate and autonomous agency improves the assessment and management of the risk exposure of the country and shields the debt agency from political pressures. It also enables the authorities to charge the agency with a clearly defined objective and to organize it to achieve that objective, without being hampered by either the management structure or pay scale of the public sector. Furthermore, assigning debt management to

an autonomous debt agency enables a clear separation of responsibilities between debt management and monetary policy, thereby avoiding the conflicts of interest that arise when a central bank is in charge of both functions.

An appropriate and transparent vehicle for communicating the objectives and preferences of the ministry of finance to the debt office is the establishment of benchmarks for the foreign currency debt portfolio. The benchmark portfolios, which can be derived using portfolio optimization techniques, specify the currency composition, the maturity structure, and the permissible instruments of the sovereign debt portfolio. To cap the exposure of the portfolio to market risks, the ministry of finance may impose strict limits on the margin of deviation of the portfolio manager from the benchmark. A key element of this framework is to disclose to the public on a regular basis both the benchmark portfolio and the performance of the debt manager relative to the benchmark. Such public disclosure is essential for creating a transparent and accountable debt management policy.