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## Role of Institutional Factors and Microeconomic Incentives

While institutional factors may not have the same proximate influence on currency mismatches as macroeconomic policies, dismissing their influence would be a mistake.<sup>1</sup> Institutional factors are important for three reasons. One, they govern the working of *microeconomic incentives*: mismatches often arise because government policies or the lack of effective market infrastructures distort private-sector decisions. Two, strong institutions increase the chances of *good macroeconomic and exchange rate policies* being adopted.<sup>2</sup> Three, strong institutions *nurture confidence*.<sup>3</sup> Confidence

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1. Eichengreen, Hausmann, and Panizza (2002) consider the argument that investors might be reluctant to lend to governments and corporations where the institutions designed to enforce their claims are weak and where there is a significant danger of debt repudiation. But there too they find that original sin is not responsive to these national factors; specifically, they report that neither a measure of the rule of law nor an index of creditor rights is statistically significant in a regression explaining cross-country differences in original sin.

2. The IMF's (2003b) *World Economic Outlook* of April 2003 provides a very convincing survey showing there is by now a large body of empirical work that institutional factors such as the quality of governance (e.g., degree of corruption, political rights, and regulatory burdens), the legal protection and enforcement of property rights, and the limits placed on political leaders matter a good deal for the level of income per capita, economic growth, and the volatility of growth—especially among countries at a relatively early stage of economic development.

3. De Nicolo, Honohan, and Ize (2003), for example, report that cross-country differences in the degree of dollarization of bank deposits are significantly related to measures of institutional quality; as such, they argue that if emerging economies are to increase the attractiveness of financial contracting in the local currency, efforts to improve the institutional environment (e.g., enforcement of adequate legal rights for creditors, quality of accounting, political stability, and the overall quality of government) should be part of the reform agenda.

effects also influence the behavior of foreign investors in a crisis. For example, employing various indices of government and corporate transparency, Gelos and Wei (2002) find not only that emerging-market equity funds hold fewer assets in less transparent countries but also that “herding” among funds is less prevalent in more transparent economies. In addition, they conclude after controlling for other risk factors, that during the Asian and Russian crises, emerging-market funds withdrew more strongly from less transparent countries. La Porta, Lopez-de-Silanes, and Shleifer (1998) conclude that countries with less protection for minority shareholders have less developed equity markets and are more vulnerable to shocks.

One general conclusion should be emphasized at the outset. If governments “rescue” private institutions that have built up currency mismatches, then they must expect such imprudent behavior to recur. Of particular importance is the scope and generosity of the official safety net for financial institutions. When illiquidity in banks’ foreign exchange exposure has been seen as posing systemic problems, the authorities (in both the industrial and the developing worlds) have frequently intervened. As noted in Hawkins and Turner (2000), generalized runs in the interbank market, as in Norway, Sweden, and Korea, led the monetary authorities to give access to their international reserves to banks to meet interbank liabilities denominated in foreign currency. In the 1980s, the Central Bank of Chile subsidized the rescheduling of banks’ dollar-denominated liabilities after successive devaluations. During the Asian crisis, comprehensive government guarantees were also (eventually) offered to bank depositors and creditors in Thailand, Indonesia, and Korea. Alba et al. (1998) argue that the earlier generous public-sector bailouts in Thailand (1983–87), Malaysia (1985–88), and Indonesia (1994) probably encouraged risk taking in the financial sectors of the Asian-crisis countries in the 1990s. Reviewing the two decades leading up to the Asian financial crisis of 1997–98, Stephen Haggard (2000) details a long history of close relationships among governments, banks, and large corporations in the Asian-crisis countries, leading to a recurrent pattern of government bailouts of troubled financial (and sometimes nonfinancial) firms.

On the whole, official assistance to cushion widespread currency mismatching problems in the nonfinancial corporate sector has been less frequent but is hardly unknown. For example, in Mexico in the early 1980s (under the foreign exchange risk coverage trust fund known as FICORCA) and in Indonesia in the late 1990s (under the Indonesian Debt Restructuring Agency, INDRA), the government essentially assumed much of the foreign exchange risk (faced by corporations) to facilitate widespread restructuring of debt denominated in foreign currency (Hawkins and Turner 2000). More recently, there were selected episodes of government bailouts of nonfinancial corporations (with foreign exchange losses) in both Korea and Malaysia.

The presumption must be that currency mismatching would have been less frequent and less severe had private-sector borrowers believed that they would have to bear most of the consequences of poor currency risk management. The Financial Stability Forum (2000) came to a similar verdict when it concluded that implicit and explicit exchange rate guarantees provided by the authorities will tend to encourage excessive borrowing denominated in, or indexed to, foreign currencies. It is for these reasons that our action plan recommends that more emerging economies should make their official safety nets (for financial institutions) more “incentive compatible.” This means ensuring that such safety nets include “prompt corrective action” and “least-cost resolution” features, and that activation of “too big to fail” measures requires explicit consent by a supermajority of the most senior economic officials—along the lines laid out in the Federal Deposit Insurance Corporation Improvement Act (FDICIA) of 1991 in the United States.

The following two sections explore two crucial elements of financial policy—development of bond markets and prudential oversight of financial institutions.

## Bond Markets

The rapid development of bond markets in emerging economies in recent years was documented earlier in the book. Although developing bond markets has been an ostensible aim of policy in several countries for many years, certain shortcomings in implementation have meant that market liquidity has not developed as much as had been hoped. Part of the explanation is the lack of an adequate market infrastructure. This includes elements such as liquid money markets, a system of primary dealers obligated to provide two-way quotes, a repo market for government bonds, and the issuance of benchmark securities.<sup>4</sup> As these elements have been widely analyzed elsewhere, further elaboration here would be redundant.

There are, however, more fundamental impediments to liquid bond markets that deserve more attention than they have so far received. As Philip Turner (2003) has argued in greater detail, policies and practices (often seemingly unrelated) continue to stifle liquidity in bond markets:

**Accounting rules that deter trading.** In many countries, institutional investors are allowed to carry bonds on their balance sheets at historic cost irrespective of market price developments. This means that losses or gains are registered only on trading, so institutional investors tend to avoid trading because it makes the reported income and balance sheet

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4. See, in particular, Haüsler, Matheison, and Roldos (2003); Mohanty (2002); Stebbing (1997); World Bank and IMF (2001).

more volatile. The absence of mark-to-market accounting therefore tends to inhibit trading in most markets.<sup>5</sup> Greater trading by pension or insurance funds in emerging markets should do much to develop better liquidity. Such long-term investors do not have the same need for liquidity as other participants in financial markets—banks, for example, have a constant need for liquidity—and therefore are especially well placed to trade by buying illiquid bonds that have become relatively cheap (thus earning the liquidity premium) and by selling highly liquid issues. Such activity could make bond markets as a whole much more liquid. The experience of several countries was that commercial banks became much more active traders in securities markets once they were required to mark at least parts of their portfolio to market. Institutional investors would respond in much the same way.

**Fragmented issuance by official borrowers.** One particular trap to avoid is that of issuing both government and central bank debt. If the government is issuing debt to finance a fiscal deficit, then the central bank should use government-issued paper. This would require careful coordination between the treasury and the central bank, which might have different interests. For instance, a central bank may want to issue bonds at a particular time or with particular characteristics, but the government might balk at this because such issuance competes with its own borrowing plans.<sup>6</sup> The failure to resolve differences between these two institutions often induces the central bank to issue its own paper—thus reducing the liquidity of the government-debt market.

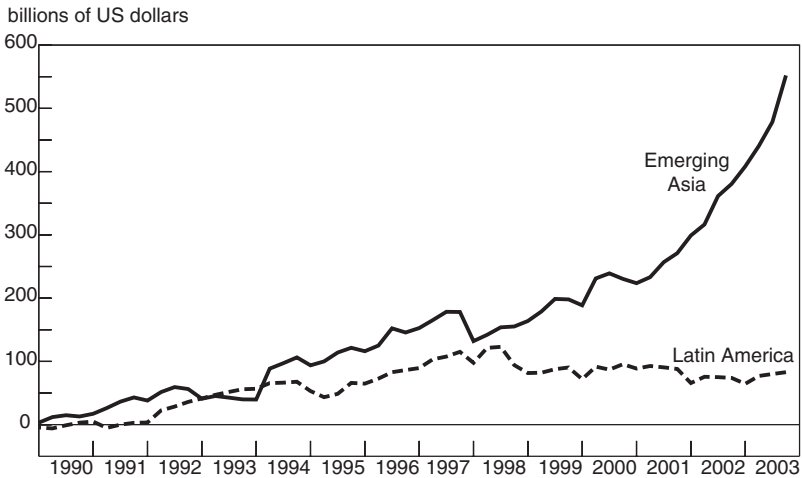
As foreign exchange reserves rise sharply in Asia, and indeed the developing world more generally, the issue of the central banks' liabilities deserves more attention than it has so far received. The management of the central banks' balance sheet has far more significant consequences for financial markets now than when the public's holdings of bank notes were the single largest liability on the central banks' balance sheet. Aggregate foreign exchange reserves in emerging Asia (excluding the international financial centers Hong Kong and Singapore) now exceed aggregate domestic currency by more than \$500 billion (figure 7.1). In some countries, reserves exceed domestic currency by several multiples (figure 7.2). In many countries, foreign exchange reserves have grown well above aggregate reserve money. Huge reserves on the asset side of a central bank's balance sheet mean that there is a large stock of liabilities on the other side. This in effect requires the creation of some form of domestic debt. Yet in many cases central banks actually create nonmarketable debt by simply absorbing the excess liquidity arising from foreign exchange inflows—that is, by taking (usually fixed-term) deposits from

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5. For a summary of current mark-to-market practices, see Mohanty (2002, table 7).

6. For further development, see McCauley (2003).

**Figure 7.1 Monetary authorities: Net foreign assets less currency held outside banks, 1990–2003**



Source: IMF's *International Financial Statistics* and national sources.

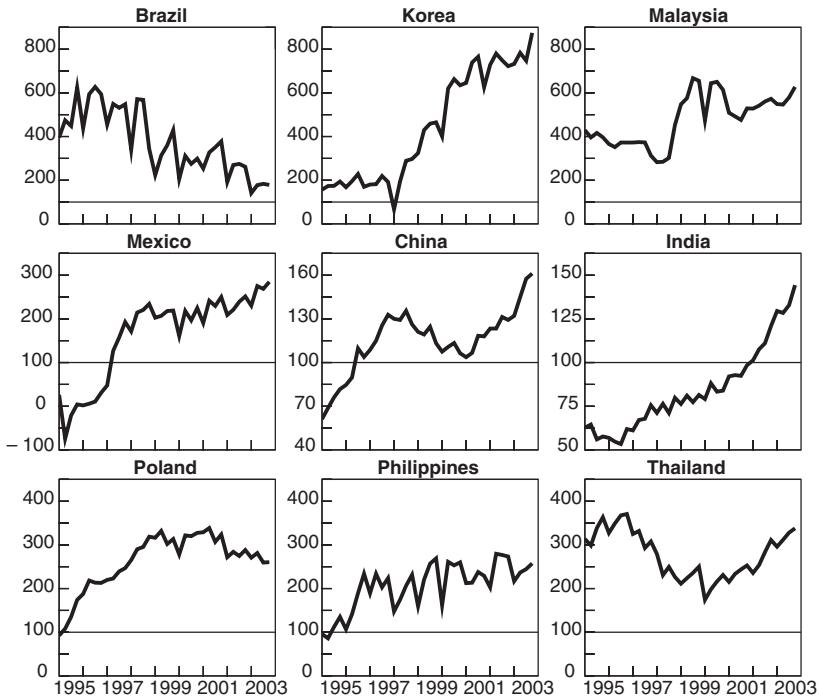
the commercial banks. In some cases, commercial banks can be forced to make such deposits. A better alternative would be to issue marketable debt and thus deepen local debt markets.

**Official attempts to stabilize bond markets.** When faced with a sharp drop in bond prices, governments are often tempted to intervene. The justification usually given for this intervention is that “new” bond markets tend to be very unstable because market participants do not have a long history to guide their decisions. In such circumstances, expectations may be destabilizing: rather than increasing demand, a falling price may engender expectations of further falls. Preventing such extreme volatility by official intervention could reduce risk premiums and thus increase the underlying demand for bonds. These are strong arguments. But the danger with too much official intervention is that it impedes the development of the market for hedging instruments and reduces the incentive for financial firms to put in place proper risk management systems. It is important therefore that any such ad hoc intervention be subject to some form of constraint to ensure that the market determination of bond prices is preserved.<sup>7</sup>

**A narrow investor base or captive market.** Many see institutional investors such as insurance companies and pension funds as key to the development of debt markets because they need to hold long-term debt.

7. Reddy (2002) gives one example. Noting that the Reserve Bank of India deliberately moderates sharp movements in yields that could emerge in auctions, Reddy says that such policies are essentially an “intra-year smoothing process” and not an attempt to manipulate prices.

**Figure 7.2 Net foreign assets of monetary authorities in selected emerging-market countries, 1995–2003 (percent of currency held outside banks)**



Source: IMF's *International Financial Statistics*.

Chile, which launched a funded pension system in 1981, is a classic example of pension fund development in emerging markets going hand in hand with bond market development.

However, governments should avoid forcing institutional investors to hold an excessive proportion of their assets in government bonds. In too many countries, these institutions under such compulsion just buy and hold until maturity virtually all the newly issued government bonds. This can undermine the creation of a true market in bonds and therefore deter other investors.

## Prudential Oversight of Financial Institutions

Before considering the implications of currency mismatches for the prudential oversight of financial institutions, it is useful to consider first the underlying rationale for regulation. One rationale is that regulations are needed to counterbalance government policies that encourage market

participants to run excessive foreign-currency risks. Such policies have been discussed throughout this book and are summarized below:

- *Overly managed exchange rate arrangements* make the private sector too complacent about exchange rate risk. The authorities often smooth short-term exchange rate movements even in countries with exchange rates that are “medium-term flexible” (i.e., where medium-term market trends are not resisted). Should the market turn against them, banks and other firms will often assume they will have time to cover their foreign exchange exposures because they know that the authorities will seek to limit how far the exchange rate can fall in any one day or any one week.
- *Bailouts of borrowers or lenders* who suffer huge losses after a substantial exchange rate depreciation—often motivated by a need to forestall a systemic threat to the banking system—almost inevitably distort incentives and create moral hazard risks.
- *Restrictions on hedging* of exchange rate risk by residents—often designed to buttress official management of the exchange rate—frequently lead to excessive private-sector exposures.
- *Taxation* of certain financial instruments inhibits the construction of efficient financial hedges.
- *Accounting rules* may allow borrowers to disguise the costs of foreign-currency borrowing. For instance, estimates of annual debt service charges on dollar debt may include the dollar interest payments due but not the capital losses due to currency depreciation. Hence a borrower with dollar debt appears to “pay” less debt service than an equally indebted borrower with local-currency debt. In many cases, borrowers—governments as much as corporations—are not required to report the impact of currency movements on the local-currency value of foreign-currency debt. Such misreporting of underlying exposures undermines market discipline.

The orthodox economic advice in such circumstances is of course that the first-best response is to correct such distortions. Such corrective measures would create the incentives for private players to limit their own currency mismatches. If all such distortions could be eliminated, and markets worked well, it could be argued that there would be no need for any specific prudential or regulatory response to currency mismatches. Only if such distortions cannot be eliminated is there a second-best case for direct regulation.

Most observers would accept this argument with respect to non-financial firms, at least in most industrial countries. But there are often greater distortions in emerging markets, some of which are hard to

remove directly. In addition, emerging markets are much more exposed to large shocks. Hence there is probably a greater and wider need for regulation, at least initially.

With respect to banks, however, the case for regulatory intervention is altogether more compelling. Financial regulators have long recognized that currency mismatching by banks carries risks that could destabilize the financial system; that the “special role” of banks in the economy (e.g., as operators of the payment system, as major underwriters and purchasers of government bonds, and as suppliers of liquidity to fledgling securities markets) makes it harder to close a troubled bank; and that a regulatory “quid pro quo,” which limits excessive risk taking, is necessary to balance lender-of-last-resort assistance. There is also a case—albeit admittedly weaker—for the regulation of financial institutions other than banks: the need to maintain confidence in local institutions and the strong interlinkages within the financial system normally dictate greater regulation of financial firms than of nonfinancial firms.

How extensive or intrusive such regulation should be is open to debate. In principle, the supervisory authorities could give banks a free hand in accepting foreign exchange exposures. Supervisory oversight could then be limited to ensuring that (1) regulatory capital requirements reflect the risks the bank is exposed to, (2) the banks have appropriate systems in place to monitor and control such exposures, and (3) transparent reporting exposes reckless risk-taking, subjecting it to market discipline. The system of regulatory oversight in most advanced economies is indeed moving in these directions, and supervisors in the developing world have much to learn from this experience.<sup>8</sup>

On the first point, a key reform would be to ensure that capital requirements more closely mirror underlying risks. In particular, borrowers with marked currency mismatches are worse credit risks than borrowers without such mismatches. This needs to be better reflected in regulatory capital than it is at present. On the second point, banks could be required to stress test their balance sheets for exchange rate changes—in particular allowing for the impact on off-balance sheet exposures in derivatives and other transactions. On the third point, it is clearly desirable that the quality of the corporate reports of financial institutions in emerging markets be improved. Of particular importance from the point of view of this study is the prompt, frequent, and accurate reporting of losses (and gains) from currency movements. Then the market can sanction reckless financial institutions and reward prudent ones.

In practice, however, financial-system regulation is usually more extensive than this model would suggest. The next part of this chapter reviews four main elements: regulations applying to lending institutions

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8. For a further development of this argument, with particular reference to Basel II, see Neumann and Turner (2002).

in major financial centers, regulation of banks in borrowing countries, oversight of overall mismatches in the banking system, and regulation of other financial institutions. This review is not meant to be comprehensive but rather outlines the main issues that arise.

## Regulation of Banks in Major Lending Centers

“There is no overborrowing without overlending.” This catch-phrase has the virtue of focusing attention on the lender as well as the borrower.<sup>9</sup> Poor decisions by apparently sophisticated financial institutions in developed countries have often increased the vulnerability of developing countries to crisis. Large-scale, short-term, dollar-denominated lending has been one flagrant instance. This raises the question whether regulators in developed markets should do more to prevent or limit such activity by banks that are under their jurisdiction. The following paragraphs therefore review the regulation of banks in major lending centers.<sup>10</sup>

A few years ago Anne Krueger (2000) argued that regulators should indeed do more, and she put forward a simple but radical proposal.<sup>11</sup> She suggested that the G-7 countries pass and enforce legislation requiring their financial institutions to accept liabilities abroad only in the local currency of the borrower. The financial institution’s resultant foreign exchange risk could then be hedged in international markets. Krueger (2000) believed that such a prudential measure would be effective because G-7 private financial institutions account for the bulk of external lending to emerging economies and because bank supervision in the G-7 countries should be up to the task at hand. The merit of this proposal is that strong, well-diversified private financial institutions in G-7 countries, along with their bank supervisors, are at present better placed to bear and oversee foreign exchange risk than are borrowers and bank supervisors in emerging economies.

However, we view this proposal as too draconian—to be adopted only if more market-oriented measures fail. A major drawback of a regulation that transferred currency risk to G-7 private lenders is that it would reduce the incentives for emerging economies to develop domestic bond

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9. See Lamfalussy (2000) for a very lucid account of the major failures of international lending institutions, often the subject of high-level discussions at the BIS in which Lamfalussy participated for many years.

10. However, a word of warning is necessary about what is realistic to expect of supervisors in major international centers. An affiliate of a large international bank may be one of the biggest banks in a small country (i.e., it is very important for the host supervisor) but yet account for only a trivial percentage of the parent bank’s balance sheet. Hence, the home supervisor of the international bank might regard its exposure in that country as immaterial and *therefore may not look too closely* at the risks involved.

11. She also put forward a proposal for local banks, which is discussed later.

markets and hedging instruments that would increase the domestic supply of local-currency finance. Such reforms within the emerging economies themselves are an essential part of the longer-term solution to the currency mismatch problem. In other words, the regulations in the G-7 countries would be a stopgap measure that would militate against an optimal medium-term solution.

Nevertheless, regulations in the major lending countries do merit a closer look because they may introduce distortions that bias lending decisions. In particular, they could in theory induce international banks to lend in the currency of the lending country (and thus avoid currency mismatches for the lending bank) instead of the currency of the borrowing country. How far specific regulations have such an effect is unclear because national practices vary widely. What follows next focuses on the broad outlines of the international regulatory framework—from the perspective of both the present Basel Accord and its proposed revision (Basel II).

The current international regulatory framework conditions lending by international banks to emerging markets by treating credit and market risks separately.<sup>12</sup> The existing credit risk framework does not distinguish between different corporate credit risks. In particular, it makes no distinction between lending in the borrower's own currency and lending in foreign currency (which can expose the borrower to a currency mismatch): both are regarded as being equivalent credit risks. Under the market risk framework, however, additional capital could be required for lending in the borrower's own currency because a capital charge of 8 percent would be levied on the overall net open foreign exchange position of the lending bank (Basel Committee 1996). If the bank is able to onlend local-currency borrowing (e.g., peso deposits as peso loans), or if it is able to lay off the foreign exchange exposure of new peso loans, then this loan would attract no additional capital charge for foreign exchange risk. In practice, an international bank would tend to book peso loans through local subsidiaries, which usually have some form of peso deposit base. As noted in chapter 3 (table 3.4), a major trend in recent years has indeed been the substitution of (usually dollar-denominated) cross-border lending of international banks with lending by subsidiaries. This allows for local-currency lending with no additional capital charge.

However, there will be many emerging-market currencies in which an international bank receives no "natural" deposits and against which it cannot find reasonably priced hedging instruments. Often all that is available locally to foreign banks is the local overnight interbank market—too risky a financing source for local lending. As most banks would not want a significant exposure in an emerging-market currency, they could in such circumstances refuse to lend in local currencies, insisting that bor-

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12. This framework is based on the present Basel Accord, not on the proposed revision, which is currently under discussion.

rowers take only dollar loans. The regulatory capital charge for market risk reinforces this. Considering this capital charge in isolation, it could be argued then that emerging-market borrowers could be induced to accept currency mismatches when they borrow from international banks.

## Credit Risk and Mismatches

Market risk cannot be considered in isolation because credit risk also enters the picture. Other things equal, a corporation with local-currency income but foreign-currency bank debt is a worse credit risk than a similar corporation with *both* income *and* bank debt denominated in the local currency.

The implication of all this is that a borrower that chooses dollar borrowing to cover local-currency business makes itself a worse credit risk. Borrowing in dollars may not be an important consideration for most industrial-country borrowers because the currency denomination of a loan would not normally be a key element of the borrower's credit risk profile. It might (or should?) send an adverse signal: a borrower that cannot afford to pay the interest on a local-currency loan could take a gamble on a dollar loan. For example, a US bank lending to a UK company would not *usually* perceive that the credit risk is any different between lending in US dollars or in pounds.<sup>13</sup> Credit risk would normally depend on other elements—the corporation's debt service ratio, the cyclicity of the industry, and so on. But the importance of the currency of denomination is far greater for emerging-market borrowers. One reason is that more borrowers have currency-mismatched debts. A second reason is that convertibility risk or transfer risk is significant. At the extreme, a country may simply prohibit its residents from paying their foreign-currency debts. A change in the exchange rate regime or any large devaluation can have virtually the same effect by making previously solvent borrowers insolvent. Such risks are not closely related to the health of the particular borrower but to more general country risk. Banks therefore incorporate country risk assessments in the decisions on lending to corporations in emerging markets. This may take the form of using a country's credit rating.

The importance of exchange rate-related credit risk means that a lending bank needs to know about the currency of denomination of the total portfolio of a customer. It is important to consider this currency dimension in countries that maintain a credit register that aggregates bank loans to each borrower.

However, just because a borrower with local-currency income but foreign-currency debt is a worse credit risk than one with an equivalent

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13. The emphasis is on "usually": there have been cases when the currency of denomination was of relevant consideration.

amount of local-currency debt does not necessarily mean that lending risks differ at the margin (i.e., for new loans). Is the credit risk associated with a new foreign-currency loan to a given borrower greater than the credit risk associated with a local-currency loan? Views about this differ. One view is that the risk is identical because it depends only on the probability of default—in which case lenders in each currency lose equally.<sup>14</sup> The counterview is that the credit risk associated with a foreign-currency loan is greater. Major rating agencies appear to have begun taking such a view as they recently rated the local-currency debt of sovereigns above foreign-currency debt. The ability (and perhaps willingness) of countries to service debt in their own currencies is beyond doubt greater now, although quantification of this is difficult.<sup>15</sup> To the extent that banks' assessment of the convertibility risk of corporate loans depends on a country's credit rating, a similar currency-of-denomination differential might arise for corporate as well as sovereign borrowers.

Some international banks resolve the local/foreign-currency dilemma by, as a matter of policy, lending to all but the largest emerging-market borrowers only through their local subsidiary or branch. In many cases, they will offer loans only in local currency (to minimize both their customer's potential currency mismatch and their own exposure to transfer risk). Yet international banks report that customers often resist local-currency denomination of their loans because dollar loans are "cheaper" to service and permit greater leverage.

The proposed new Basel Accord should help stiffen banks' resolve by aligning capital requirements more closely to differences in credit risk. This means that a borrower that is highly leveraged with foreign-currency loans will be regarded as a worse credit risk and charged accordingly. The greater and more systematic use of default data should over time clarify the extent to which foreign-currency loans should be regarded as a worse credit risk than local-currency loans. The wider use of credit ratings in bank regulation will reinforce this. In short, then, regulators are likely to become more aware that the greater reliance on local-currency lending could reduce some of the risks facing international banks.<sup>16</sup>

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14. It may not be so simple, however. It could be argued that the probability of default depends on the probability of devaluation. In a default after a massive currency devaluation, the dollar-denominated claims rise relative to local-currency claims. Hence, recovery values are higher for those who have lent dollars. See Aghion, Bacchetta, and Banerjee (2001).

15. Note, however, that this issue of the differential credit risk according to currency of denomination is controversial, and further theoretical clarification and empirical research are required. Packer (2003) shows that rating agencies differ sharply among themselves in the size of the rating differential across currency. Historical default data—which one uses to calculate an appropriate rating differential—are mainly from bank loans, and such data may not be a good guide.

16. Nevertheless, country or transfer risk will of course remain.

## Regulation of Banks in Borrowing Countries

The regulation of foreign exchange exposures of banks in borrowing countries gradually became more comprehensive as internationalization proceeded. What form of regulation? Earlier, exchange controls drastically restricted access to foreign currency—usually only to those who needed foreign exchange for an approved purpose (usually trade). Virtually all local bank accounts were therefore denominated in the local currency. Loans were also denominated in local currency, so that there was no currency mismatch in the banking system. Over the years, however, exchange controls have become increasingly porous and have, in many cases, been dropped.

As exchange controls were eased, greater attention was given to prudential controls on banks. An early decision regulators needed to make was whether to allow residents to maintain accounts denominated in dollars (or other foreign currencies). Fearing that refusal would drive deposits offshore, many authorities allowed local banks to take dollar deposits from residents.<sup>17</sup> In some cases, governments (often via state banks) went even further and offered residents rates of interest on dollar deposits higher than obtainable on international markets. Such practices—subsidizing returns on dollar deposits—should be avoided in all but extreme circumstances.

Once the decision of taking local deposits is made banks and their regulators have to consider whether local- and foreign-currency deposits should be considered differently.<sup>18</sup> They also have to consider appropriate dollar-denominated assets to balance such dollar liabilities.<sup>19</sup> At the risk of some oversimplification, the supervisory authorities in various countries have used five types of regulatory rule/practice. The following sections outline such rules, pointing in particular to ways in which rules have been strengthened in recent years.

### 1. Limits on Net Foreign Exchange Positions

The most common rules limit the size of banks' net open positions. Banks' short or long positions in foreign exchange can be limited to a certain percentage of capital. Such exposures were traditionally defined in terms of

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17. But some countries continued to prohibit banks from taking deposits from households.

18. The question of whether foreign- and local-currency loans represent different credit risks was discussed earlier. Broda and Levy Yeyati (2003) argue that peso and dollar claims are likely to be treated equally in the event of bank default. Where dollar deposits are the only source of default risks, it means that banks are induced to attract dollar deposits above the socially desirable level.

19. In some cases, it was a strong local demand for dollar-denominated bank loans that first induced banks to incur dollar-denominated liabilities (often interbank loans in international markets).

balance sheet ratios (usually supplemented by allowance for forward transactions) at a point in time. But underlying exposures can easily be hidden nowadays by the creative use of derivative instruments more complex than forward positions. Peter Garber (1998) shows how large-scale purchases by Mexican banks of tesobonos swaps and structured notes in 1994 permitted these banks to take leveraged long positions on the Mexican peso in the run-up to the crisis. According to accounting practices prevailing then (which did not cover off-balance sheet exposures), these derivative positions were booked as matched currency positions (involving both a dollar-denominated liability and a dollar-denominated asset); hence, they did not count against the prudential limit on banks' net open foreign exchange position (then, 15 percent of capital). When the peso plunged sharply at the end of 1994, however, these long positions on the peso saddled Mexican banks with huge losses and prompted a rush for cover—a process that drove the peso even lower. As the Mexican case study illustrates, when derivatives are involved, what one sees (about foreign exchange exposure) is not always what one gets.<sup>20</sup> In order to prevent such manipulation, *any* position in an asset or liability (whether cash or derivative) that increases its value measured in domestic currency when the currency depreciates should be considered as a long position in foreign exchange.<sup>21</sup> Provisions governing net open foreign exchange positions in emerging markets are summarized in table 7.1.

## 2. Limits on Foreign Exchange Liabilities

In addition to limits on net open positions, rules usually apply to the nature of gross assets. The first dimension is the proportion of dollar deposits to be invested in high-quality offshore and liquid markets (on which the bank can earn a retail/wholesale spread and possibly a yield curve spread) rather than onlent locally.<sup>22</sup> A safety-first policy would indicate that a high average proportion should be invested offshore, perhaps with specific liquidity requirements. Some form of marginal requirement could reinforce this—for example, sharp increases in dollar-denominated deposits, which often reflect increased nervousness about the exchange rate,

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20. This example of Mexican banks purchasing tesobonos swaps and structured notes from international banks provides another case when nonresidents of emerging economies were willing to stand on the other side of hedging/speculative contracts.

21. O'Dogherty and Schwartz (2001) explain that the regulations in force in Mexico before the 1994–95 crisis took the form of static accounting valuations. Mexican banks were therefore able to circumvent regulatory limits on foreign exchange positions by holding structured notes denominated in pesos.

22. Rather different issues arise when banks invest in *low-quality* financial assets offshore; this is discussed below.

**Table 7.1 Guidelines or regulations for currency mismatches in banks**

Country	Nature of guidelines or regulations	Minimum for liquid foreign-currency assets <sup>a</sup>
Brazil	Consolidated net foreign capital cannot exceed 60 percent of total capital; capital requirement of 50 percent of total exposure for net positions exceeding 5 percent of capital	
Chile	Banks' foreign exchange mismatches cannot exceed 20 percent of core capital. Insurance companies and pension funds do not face any restrictions.	Demand: 19 percent; time: 14 percent
Colombia	Foreign exchange risk calculated by multiplying net positions by "highest possible variation of exchange rate."	No
Mexico	Open position is limited to 15 percent of Tier 1 capital. In addition, a rule limiting leverage in foreign currency: the difference between assets and liabilities denominated in foreign currency weighted by maturity cannot exceed 1.83 times Tier 1 capital.	Banks must keep liquid assets to cover the largest gap between liabilities and assets in four maturity bands: up to 1, 8, 30, and 60 days.
Peru	Banks must try to keep a balance between their foreign currency assets and liabilities. Banks' net currency foreign exchange positions are almost equivalent to their net worth.	20 percent
Venezuela		17 percent
China		Yes
Hong Kong	Aggregate net overnight open position (excluding HK\$/US\$) of domestic banks should normally not exceed 5 percent (some sophisticated banks are allowed up to 15 percent) of capital and any single currency should not exceed 10 percent against.	No; but need to state policy
India	Open position relative to capital is limited. Banks are required to adhere to the open position limit on a daily basis and allocate capital on the approved limit.	
Indonesia	Banks' overall position (defined as the sum of all long positions or the sum of all short positions, whichever is greater) should not exceed 20 percent of capital.	3 percent of foreign-currency cover
Korea	Banks' net open position should not exceed 20 percent of tier I capital.	

*(table continues next page)*

**Table 7.1 Guidelines or regulations for currency mismatches in banks (continued)**

Country	Nature of guidelines or regulations	Minimum for liquid foreign-currency assets <sup>a</sup>
Philippines	Banks must maintain 100 percent cover for their foreign exchange deposits, at least 70 percent of which must be in the same currency as the deposit. Long open foreign exchange position is limited to 5 percent of capital or \$10 million, whichever is lower.	
Singapore	No limits on banks. For insurance companies, foreign-currency and overseas assets cannot exceed 30 percent of assets.	No
Thailand	Banks' net open position must not exceed 15 percent of Tier 1 capital.	No
Czech Republic	The net position in each currency not to exceed 15 percent (and total tonex position not to exceed 20 percent) of the bank's own funds	No
Hungary	Banks' net open position must not exceed 30 percent of capital.	
Poland	For banks, the limit on foreign exchange net open position is 15 percent of capital for an individual currency and 30 percent overall. For nonconvertible currencies these limits are 2.5 percent and 5 percent, respectively. There are no regulations on insurance funds. For insurance companies, the total value of assets in a single currency cannot exceed 5 percent (12 percent for euro).	No
Russia		No
Israel	Banks are subject to a directive consistent with Basel Committee recommendations.	Some reserve requirements
Saudi Arabia	No regulations, but banks run very tight open nondollar positions and higher net short positions against the dollar due to the fixed exchange rate regime and preference for dollar assets.	
South Africa		No

a. These data are usually expressed as a proportion of gross liabilities and are generally as reported in Hawkins and Turner (2000).

Note: This summary of guidelines was prepared in 2002 and is intended to be illustrative. The actual regulations are more complex and may have been revised since this table was prepared. In addition, some countries have complex rules that are difficult to summarize in a simple table.

Sources: Central banks.

could be subject to higher marginal requirements to redeposit offshore. Argentina's experience with such requirements is particularly instructive. A cornerstone of the currency board arrangement in that country was a high foreign liquidity requirement on the banks (20 percent of most banking liabilities). Only assets with a high credit quality were acceptable: they included highly rated foreign bonds and deposits with a major designated foreign bank in New York.<sup>23</sup> This provision helped the banks weather successive crises in the late 1990s. In early 2001, however, the Argentine government began to weaken this prudential requirement—by lowering the liquidity requirement and by replacing deposit accounts abroad with dollar accounts held with the central bank. These measures weakened the banking system.

A second dimension of such rules will often be specific guidelines about local-bank lending in foreign currency. Sometimes these are qualitative in nature—for instance, supervisory guidelines can allow foreign-currency lending only to those borrowers with foreign-currency earnings or assets. Or there could be a currency-denomination dimension to collateral requirements—for instance, foreign-currency loans could be secured only against foreign-currency assets such as export receivables.<sup>24</sup> Several central banks have recently required that the boards of directors at lending banks explicitly discuss foreign-currency exposures of corporate clients that exceed a certain size. Banks are required to ensure that their customers have effective hedging strategies. The Reserve Bank of India since November 2003 requires that “all foreign currency loans by banks above \$10 million be extended only on the basis of a well laid out policy of the Board to ensure hedging.”<sup>25</sup>

Sometimes such guidelines are quantitative. For instance, several authorities impose ceilings on liabilities a bank can hold in foreign currency in order to limit foreign currency-denominated lending to local borrowers. In Chile, banks are required to hold special reserves to cover lending to clients with large mismatches. Noting that crises in Mexico and Asia proved that “banks have a tendency to overestimate that ability of their

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23. Allowing bank deposits rather than marketable instruments creates an additional monitoring need for the supervisors who will have to make sure that local banks do not conclude hidden arrangements allowing such deposits to be used as collateral for other business.

24. In practice, however, local-currency collateral is taken even for foreign-currency loans, which means that the collateralization needs to build in additional local-currency safeguards. One possibility is to apply a larger “haircut” to the collateral value of a local-currency asset. Another is to “remargin”—to require additional collateral as the exchange rate falls.

25. Except for trade finances, etc. See Reserve Bank of India (2003, 34–35) on unhedged foreign exchange exposures of corporates. This move was triggered as the combination of expectations of exchange rate appreciation and comparatively high rupee interest rates encouraged corporations to increase their dollar borrowing.

**Table 7.2 Currency denomination of bank balance sheets**  
(percent denominated in foreign currency)

Region/country	Assets				Liabilities			
	1983	1993	2000	2002	1983	1993	2000	2002
<b>East Asia</b>								
Indonesia	n.a.	35.1	10.4	8.5	n.a.	36.4	9.4	4.9
Korea	5.1	4.1	5.9	4.5	12.6	3.9	4.3	6.9
<b>Latin America</b>								
Chile	41.6	19.7	24.1	25.8 <sup>a</sup>	46.7	20.6	25.4	28.8 <sup>a</sup>
Colombia	n.a.	13.0	6.5	n.a.	n.a.	11.1	7.5	n.a.
Mexico	41.7	26.7	18.1	15.0	47.2	28.2	17.8	14.5
Peru	35.0	76.3	82.0	78.9	44.0	69.0	70.0	65.3
Venezuela	7.0	12.2	4.5	6.4	9.3	3.5	0.1	0.1
Hungary	n.a.	28.8 <sup>b</sup>	34.1	n.a.	n.a.	30.9 <sup>b</sup>	34.2	n.a.
Israel	n.a.	36.1	30.4	33.1	n.a.	36.9	27.8	30.0
Russia	n.a.	29.0 <sup>c</sup>	n.a.	n.a.	n.a.	25.1 <sup>c</sup>	n.a.	n.a.
Saudi Arabia	12.3	25.6	22.3	18.8	21.5	29.1	14.2	8.5
<i>Memorandum:</i>								
United States	0.4	1.6	0.9	1.0	0.3	2.1	1.2	1.1
Japan	14.4	12.0	3.8	3.8	14.4	12.8	5.1	4.7
Germany	2.1	5.1	3.9	4.4	2.2	4.1	7.0	7.8
United Kingdom	90.6	69.7	53.3	52.6	93.2	70.7	48.0	49.0

n.a. = not available.

a. 2001 figure.

b. 1996 figure.

c. 1995 figure.

Sources: National sources and Bank for International Settlements statistics.

domestic borrowers to access foreign currency," O'Dogherty and Schwartz (2001) describe the regulations that the Bank of Mexico put in place after the Mexican crisis. One apparent consequence of this regulation (and of macro-economic policies to lower inflation) has been a significant reduction in the degree of dollarization in banks' balance sheets in Mexico (table 7.2).

Balino, Bennett, and Borensztein (1999) report that a few developing countries set restrictions on foreign-currency loans to limit credit risk—by requiring that such loans only be extended either for trade-related purposes (e.g., Vietnam) or when the borrower can generate income in foreign currency. But in most cases foreign-currency loans are not restricted. This may suggest a need in several countries to tighten prudential oversight in this area.

### 3. Rules for Liquidity Risks

It cannot be emphasized too strongly that the management of liquidity risk is much more complex in a world of currency mismatches than it is in an environment where only the bank's local currency is used.<sup>26</sup> Even when a

bank has its foreign-currency liabilities matched by foreign-currency assets, some of these assets (e.g., illiquid dollar-denominated bonds) may not be accessible “on short notice” to meet a depositor run or other unexpected shocks. Moreover, the consequences of mistakes in liquidity management can be much more dramatic because a bank in a developing country may not be able to borrow foreign currency in the event of a liquidity crisis. In addition, the strategy followed by commercial banks of combining short-term foreign-currency liabilities with long-term foreign-currency assets exposes them to an interest rate risk that must be managed.

The authorities need to oversee liquidity risk *both* in individual banks *and* in the banking system as a whole. Consider first liquidity risk in an individual bank. To address it, a bank needs to begin by constructing a “maturity ladder,” so that it can calculate excesses or deficits at selected maturity dates—next day, next week, next month, next year. Such maturity ladders and other estimates of liquidity then need to be supplemented by various stress tests based on scenarios related to currency fluctuations. In particular, banks will need to allow for rapid changes in the liquidity profiles of assets and liabilities during a currency crisis. Increased expectations of currency depreciation—or just greater uncertainty—will induce borrowers to repay dollar loans and depositors to switch to dollar deposits—thus upsetting the bank’s foreign-currency liquidity calculations. The key point to remember is that early action to maintain liquidity is essential because the closer a large liquidity gap gets, the more difficult it becomes to offset.

In principle, supervisors could be content with verifying that banks have proper liquidity management systems in place and ensuring that any official liquidity assistance (e.g., emergency central-bank financing) comes at a price. In practice, however, some form of direct regulation may need to support such measures. Supervisors in several emerging economies do require their banks to meet a menu of liquidity requirements across various maturities. Shorter-term liabilities typically incur higher liquid asset requirements.<sup>27</sup>

Consider next liquidity risk in the banking system as a whole. It would be very useful if bank supervisors or central banks were to aggregate the liquidity gap analysis of individual banks to construct maturity ladders for the whole economy. This analysis could then be stress tested for various exchange rate scenarios, which could give early warning of liquidity shortfalls at particular maturities and perhaps allow rules on individual banks to be tightened.

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26. Further details of liquidity risk management are given in two short documents issued by the Basel Committee (see Basel Committee 1992, the updated Basel Committee 2000, and table 7.1).

27. Liquidity coefficients applied in major emerging-market countries are shown in Hawkins and Turner (1999).

## **4. Reserve Requirements**

In principle, reserve requirements for foreign-currency deposits should be higher for dollar than for local-currency deposits—because the central bank cannot supply foreign currency as readily as domestic currency in times of stress. In practice, however, some countries set very low reserve requirements for foreign-currency deposits because they do not want to risk driving deposits to centers where reserve requirements are lower. In some countries (e.g., India), reserve requirements on foreign-currency deposits have been modified over time in line with the policy stance on capital flows.

The review by Balino, Bennett, and Borensztein (1999) of actual practices in 36 developing countries (as of end-1996) found that in only about 20 percent of the countries were reserve requirements higher for foreign-currency deposits; in two-thirds of the countries, they were usually set at the same rate as domestic-currency deposits, and in roughly one-seventh of the sample, they were actually lower than for domestic-currency deposits.

## **5. Limits on Banks' Holdings of Foreign Currency-Denominated Securities**

In addition to earning a maturity spread, banks can choose to accept some credit risk by investing in paper issued by lower-rated borrowers. Banks in emerging markets are often particularly attracted to the high yields of international foreign-currency bonds issued by their governments. When sovereign debt spreads widen sharply, such debt becomes more attractive to local banks, which are already exposed to country risk through their holdings of local-currency bonds. As these banks tend to regard international and local bonds as equivalent credit risks, even though some would argue that greater risks normally attach to foreign-currency bonds, they tend to sell local-currency bonds to buy foreign-currency bonds. This means that a widening of spreads in international markets can in effect induce banks to increase the dollarization of their balance sheets, encouraging them to take dollar deposits from residents. Increased dollarization could make them more vulnerable in a crisis. For these reasons, limits are sometimes placed on local banks' holdings of foreign currency-denominated debt of their own government or other less-than-investment-grade issuers.

### **Will Prudential Rules Suffice?**

The preceding discussion suggests that supervisors in emerging markets have many tools at their disposal to keep in check currency mismatches in their banking systems. Before leaving this topic, however, mention must be made of the view that the authorities in emerging markets go

further and virtually prohibit foreign currency–denominated intermediation within the financial system. Some have argued in favor of such a step. Before becoming first deputy managing director of the IMF, Anne Krueger (2000) suggested that emerging economies consider making foreign-currency obligations incurred by domestic entities (residents and businesses) within their boundaries unenforceable in domestic courts. This would presumably transfer abroad more of the currency risk and would remove any implicit government guarantees to offshore borrowing. This proposal amounts to placing an implicit “tax” (i.e., nonenforceability of contracts) on foreign-currency obligations incurred by domestic entities. We would not support such a tax. The concern should not be with foreign-currency liabilities per se but rather with foreign-currency mismatches. If domestic entities in emerging economies balance their liability positions with foreign-currency assets, then the former should not lead to adverse consequences after an exchange rate change. Indeed, as noted elsewhere in this book, empirical research suggests that firms with foreign-currency revenues are more likely to incur foreign-currency liabilities than firms without such revenues. Policy measures should seek to encourage and spread the use of such “matching” measures. By taxing foreign-currency liabilities rather than the currency mismatch, the Krueger proposal could inhibit natural risk-reducing strategies at the level of individual firms and banks in emerging economies.

## **Aggregate Mismatches in the Banking System**

In addition, supervisors may need to monitor aggregate mismatches in the banking system (the so-called “macroprudential” dimension). There are several reasons why this is necessary in addition to overseeing mismatches in individual institutions. The first is that those responsible for the detailed supervision of individual institutions cannot check everything but need to be given guidance as to what is important in quantitative terms. Large or rising currency mismatches (even if crudely measured) for the system as a whole give such a signal. The second reason is that individual institutions acting in isolation may overestimate their ability to hedge foreign exchange risk over a short period of time during a crisis. Banks will typically not hedge for very large exchange rate changes. Instead, they will often cover themselves against a near-term movement of up to, say, 5 percent in the exchange rate and then roll over such hedges. They will often implicitly count on the existence of markets to put on new hedges, should the rate move sharply against them. Individual banks may be quite aware that aggregate exposures mean that other banks will try to hedge at the same time, putting hedging markets under strain. This is likely to be a major risk in thin, comparatively underdeveloped foreign exchange markets.

An aggregate measure for the economy as a whole such as that outlined in chapter 4 could be of some use. So could the aggregations of the standard measures based on reported balance sheet positions that were outlined earlier—notably net open positions and gross foreign-currency lending to domestic firms. But such indicators tell only part of the story. Other questions that need to be asked: Is foreign-currency lending concentrated in firms with foreign-currency earnings? Do firms with foreign-currency bank loans also have foreign-currency assets? Do banks take such assets as collateral? How can off-balance sheet exposures be aggregated? And so on. Designing a reporting framework to answer these questions in order to support effective “macro” oversight of currency mismatches would be complex but nevertheless an important endeavor. To our knowledge, relatively little progress has been made on this to date.

## Regulations of Other Financial Institutions

Banks are not the only financial institutions in emerging economies (or industrial ones) to face prudential measures on the currency composition of their operations. Mutual funds/unit trusts and pension funds too face guidelines or limits. When such limits are imposed, it is usually on the share (or absolute amount) of assets that can be invested abroad. Table 7.3 provides a summary of rules for fund managers in most of the major emerging economies (as of 2001).

In industrial countries, concerns of prudence originally motivated such limits on foreign assets—that is, investments in emerging markets were treated like other high-risk assets. There was a concern that fund managers who purchased assets in emerging economies would be taking on excessive risk, would be jeopardizing the fund’s performance, and would not be respecting their conservative investment mandates. Gradually, however, this view gave way to a more liberal regime that was more in tune with the lessons of modern portfolio theory. Specifically, the argument was that since stock market returns in the OECD areas were weakly correlated with those in emerging economies, greater diversification would allow OECD investors to obtain higher risk-adjusted returns. In addition, by almost any metric, studies showed that investment portfolios in all the G-7 countries were subject to a large “home bias” that left the share of emerging-market assets well below what would be regarded as optimal; indeed, to justify the existing portfolio allocation, G-7 investors would have to be expecting unrealistically optimistic returns on their home investments.<sup>28</sup> More recently, the expected effects of population aging on expected OECD pension returns have boosted the case for

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28. See Obstfeld (1993), Mussa and Goldstein (1993), and Reisen (2000).

**Table 7.3 Rules on fund managers' holdings of foreign-currency assets**

Country	Mutual funds/unit trusts	Pension/superannuation funds
Argentina	<25 percent	<17 percent
Brazil	Allowed, with limits depending on the type of fund	<10 percent
Chile	No limit	<16 percent (gradually raised from <2 percent in 1992)
Colombia	No limit	<10 percent foreign investments <50 percent sovereign external debt
Mexico	Allowed	<10% in investment grade securities registered in Mexico
Peru	No limit	No limit
Venezuela	No limit	No limit
China	Not allowed to invest abroad	
Hong Kong	No restrictions	No restrictions, except for funds under Mandatory Provident Fund scheme; Capital Preservation Fund (CPF): 0 percent; non-CPF: <70 percent
India	<\$50 million in ADRs/GDRs of Indian companies and related foreign companies	
Indonesia	Only if issued by local company	Only if issued by local company
Korea	No restrictions	No restrictions
Singapore	No restrictions	<30 percent
Thailand	Permission required from the central bank	Permission allowed for the holding of foreign currency–denominated securities issued by public enterprises and Thai commercial banks only
Czech Republic	Only deposit money or OECD marketable securities	Only deposit money or OECD government bonds
Hungary	Limited	Limited
Poland	<5 percent	<5 percent
Israel	No limit	No limit for January 1, 2003
South Africa	<15 percent (and under asset “swap mechanism” can only accumulate foreign assets while they can find foreign parties investing an equal amount in the domestic market)	<15 percent (and under asset “swap mechanism” can only accumulate foreign assets while they can find foreign parties investing an equal amount in the domestic market)

ADR = American depository receipts

GDR = Global depository receipts

OECD = Organization for Economic Cooperation and Development

Note: This summary of guidelines was prepared in 2002 and is intended to be illustrative. The actual regulations are more complex and may have been revised since this table was prepared.

Source: Central banks.

greater diversification into emerging-market assets. Once the baby boomers start retiring, the rise in the capital-labor ratio will reduce the return on capital relative to wages; also, as the baby boomers draw on their pension assets to fund their retirement, prior asset accumulation will give way to a long period of asset decumulation. But as Helmut Reisen (2000) argues, both these effects can be mitigated if OECD pension funds increase their asset allocation toward emerging markets. In a global capital market, a declining labor force or asset decumulation will not lower the returns to capital because the younger population of emerging economies will be entering the labor force, making a net contribution to their pension funds, and increasing their demand for capital.

In emerging economies, guidelines or regulations limiting the share of mutual- or pension-fund assets that can be invested abroad had a different rationale. As argued by Hawkins and Turner (2000), the most likely explanation is that authorities wanted to retain more scarce capital at home for domestic development. Moreover, since average stock market returns are normally expected to be higher in emerging economies in the period ahead than in industrial countries, such limits on foreign assets would not entail a sacrifice in terms of expected average returns. But this self-reliance argument ignores risk and diversification. Small economies and small financial systems have a higher concentration of risks than larger ones. Consistent with this proposition, empirical work by Caprio and Honohan (2001) shows that small financial systems in emerging economies have had over the past three decades a much higher incidence of financial crises than larger ones. Again, because of the low correlation of returns between industrial and emerging economies, the latter could reduce their risk by investing a higher share of pension and mutual funds in OECD countries; as in industrial countries, investment portfolios in emerging economies also show a pronounced home bias that leaves actual diversification far short of what would be optimal. Reisen (2000) argues that a lower-risk portfolio would be consistent with the needs of pension beneficiaries in emerging economies, many of whom are poor and cannot tolerate high risk. He also maintains that the existing home bias in emerging-market pension funds is more than sufficient to generate a demand for domestic financial assets (e.g., domestic bonds), as these countries seek to deepen their domestic financial markets and strengthen their institutional infrastructure. Williamson (2000) also (implicitly) backs greater international diversification of emerging-market portfolios by arguing that concerns about large foreign investments affecting the exchange rate and domestic bond markets are misplaced: since the diversification of pension assets would encourage international equity market integration rather than interest rate linkages, it would do little to limit monetary-policy sovereignty in emerging economies. If there is a case for initial and temporary localization requirements for pension-fund

**Table 7.4 Structure of pension fund assets in 2000 (percent)**

Country	Foreign securities	Domestic securities		
		Public-sector bonds	Other bonds	Other securities
Chile	11	36	6	45
Colombia	23	35	18	24
Peru	7	9	36	48
Korea	n.a.	2	43	55
Indonesia	n.a.	n.a.	42	58
Hungary	2	66	12	18
Poland	0	92	0	8
Israel <sup>a</sup>	1	71	5	23
Saudi Arabia	10	90	n.a.	n.a.

n.a. = not applicable

a. Average of pension funds.

Sources: National sources. Summarized in Mihaljek, Scatigna, and Villar (2002). Table 17 in that paper shows estimates for 1995.

investments, Reisen (2000) concludes that it is in easing the fiscal costs of moving from unfunded to fully funded pension systems in emerging economies.

As revealed in table 7.3, limits on foreign-asset holdings tend to be somewhat more restrictive for pension funds in emerging economies than for their mutual funds. Worthy of note also is the substantial increase in the foreign-asset limit of Chilean pension funds, going from less than 2 percent in 1992 to 16 percent in 2000. As explained in Marshall (2000), the allocation of resources in Chile is highly specialized, with exports still highly dependent on copper. By allowing greater international diversification of pension- and mutual-fund assets, the Chilean authorities have sought to reduce the concentration of risk in domestic assets and thereby improve the resilience of the economy to shocks. With the exception of Chile, Colombia, and Saudi Arabia (and of course, Hong Kong and Singapore), the pension funds in most emerging markets invest little in foreign securities (table 7.4).

Because pension and mutual funds in emerging economies have liabilities denominated exclusively in local currency, because their liabilities are not redeemable at par, and because their foreign assets are likely to be weighted heavily toward equities, their net open position in foreign currency is of quite a different character (less subject to a liquidity crisis) than that of banks in emerging economies. For such institutional investors (pension and mutual funds), measures that lead to a larger currency mismatch typically are associated with a *creditor* net open position and reduce risk—not increase it. The nature of the mismatch (long on foreign currency) goes in the opposite direction to the mismatches that have plagued emerging markets.

## Rules for Nonfinancial Corporations?

The official sector in industrial countries has been considerably more cautious and less intrusive in subjecting nonfinancial corporations to guidance or regulations on currency mismatching. This presumably reflects a view that a failure of a large corporation would have less adverse spillovers for the economy (*ceteris paribus*) than would failure of a large bank, that it is the business of commercial banks—not the official sector—to monitor credit and market risk in its more important clients, and that their market discipline over excessive risk-taking in the corporate sector can be effective if there is good public disclosure of foreign exchange exposure. For example, the Financial Stability Forum's Working Group on Capital Flows (2000, 3) concluded that "the primary mechanism for risk control in this area [nonbank private sector] should be improved transparency." Current public disclosure of currency mismatches in the corporate sector is meager.

In emerging economies, those countries that still maintain some controls/restrictions on capital flows often put conditions on foreign borrowing by corporations. For example, India regulates foreign borrowing (other than trade credit) by companies, insisting on a minimum maturity of five years for loans over \$20 million and outlawing put options to subvert this constraint (Hawkins and Turner 2000). Malaysia has long required that firms taking on foreign-currency obligations be able to point to a tangible source of foreign-currency earnings to service the debt.

Interestingly enough, the private international capital markets themselves have sometimes made sharp distinctions between producers of tradables and nontradables in granting access to foreign currency-denominated credit. In this connection, Anne Krueger and Aaron Tornell (1999) report that Mexican export firms and their affiliates have been able to obtain financing in international capital markets since the early 1990s: the 1995–97 credit crunch mainly hurt small and medium-sized firms in the nontradables sector. The 142 nonfinancial firms listed on the Mexican stock exchange are composed mainly of tradable-sector firms. In 1997, this set of firms had an export-to-sales ratio of 40 percent and over half (53 percent) of their liabilities denominated in foreign currency. Even more notable is the fact that these firms with the highest share of liabilities denominated in foreign currency had a higher-than-average export-to-sales ratio. Their explanation for this tradable/nontradable distinction is that firms exporting a substantial portion of their sales are more likely to be able to provide collateral in the form of receivables denominated in dollars.<sup>29</sup>

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29. Caballero and Krishnamurthy (1998) present a theoretical model where insufficient domestic collateral in emerging economies drives financial crises.

To the extent that the tradable/nontradable nature of a firm's output affects its access to foreign currency-denominated financing, two implications would seem to follow. First, a currency mismatch of a given size is apt to be more a cause for concern (i.e., have higher crisis vulnerability) when it occurs in the nontradable than in the tradable sector; as such, one can reduce crisis vulnerability by redistributing currency risk within an emerging economy from producers of nontradables to those of tradables. In other words, hedging of currency risk is not exclusively about getting nonresidents to assume more of it; there are things that can be done domestically as well. The second implication is that vulnerability and sustainability of an emerging economy's external debt burden should take some account of the size of its export sector. In this regard, perhaps one reason Argentina and Brazil had such difficulty in recent years in convincing private creditors that their external debt position was sustainable related to the fact that their debt-to-export ratios were so high. Pointing out to investors that these external debt ratios expressed in terms of GDP are much more moderate may not cut much ice.

The Asian crisis may have caused regulators in both industrial and emerging economies to reassess their views on the merits of a relatively "hands-off" approach to currency mismatching for corporations. In that crisis, banks did not exercise careful credit assessment over foreign exchange risks in their corporate customers (indeed, neither banks nor the official sector may have fully appreciated the size of the external debt of the corporate sector) nor was the market careful in constraining the foreign-currency borrowing of nontradable firms (including property developers).<sup>30</sup> And in the end, the need for substantial corporate restructuring in several of the crisis countries greatly complicated the task of restructuring the banking system and contributed to the depth of the recession. This has led to a renewed interest in, *inter alia*, (real-time) credit registries for companies, incorporating foreign exchange hedging as one of the conditions to qualify for bank loans, and making the currency and maturity composition of assets and liabilities a more prominent feature of companies' audited reports and accounts.<sup>31</sup>

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30. Goldstein (1998) and BIS (1998) emphasize the lending boom and the concentration of credit going to real estate and equities as an important factor in the Asian crisis. BIS (1997) provided a precrisis analysis of financial fragility in Asia.

31. See Financial Stability Forum (2000) and the discussion in chapter 5.

