



# Financial Crisis and Regulation

---





# Reform of the Global Regulatory System: Perspectives of East Asia's Emerging Economies

YUNG CHUL PARK

*The 2008 global economic crisis has corroborated that strong economic fundamentals and a rational macroeconomic policy framework may not be enough to spare emerging economies from liquidity and currency crises unless they are able to mitigate the consequences of maturity and currency mismatches in the balance sheets of banks and other financial institutions. The mismatching of maturity was one of the major causes of the financial collapse in advanced countries in the run-up to the 2008 crisis. Unlike in advanced economies, maturity mismatch in emerging economies is often accompanied by currency mismatch and a currency crisis when global liquidity evaporates. This is because emerging economies cannot borrow in their own currencies from international financial markets. This disadvantage constitutes a premium on emerging economies' external borrowing, which means that there is no level playing field for financial institutions from emerging economies engaged in international financial intermediation. Unless institutional arrangements such as a global liquidity safety net, which is on the G-20 reform agenda for global liquidity assistance, are established, emerging economies may not be able to prevent or better manage liquidity and currency crises in the future and hence may have to reexamine the costs and benefits of integrating into the global financial system.*

The current global economic crisis has exposed many structural weaknesses in the financial systems of advanced countries. Since the United States and other developed countries dominate international financial intermediation, these weaknesses have been ingrained in and reflected the frailties of the global financial system. The crisis has zeroed in on the efficiency of self-regulation of the market, which has been the cornerstone of Western regulatory philosophy. The widespread misgivings about the

---

Yung Chul Park is distinguished professor in the Division of International Studies, Korea University.

*Annual World Bank Conference on Development Economics 2010, Global*  
© 2011 The International Bank for Reconstruction and Development / The World Bank

role of the market have given way to tighter regulation of financial institutions and markets. It should come as no surprise that just about every aspect of finance has come under scrutiny for reform—to name a few, issuance and trading of various structured derivative products, shadow banking, and the activities of multinational financial conglomerates headquartered in different jurisdictions.

Some of the conspicuous structural deficiencies were the failings of the international regulatory system. According to the Financial Services Authority (FSA 2009), the global regulatory system failed to identify growing macro- and microeconomic-prudential risks that called for policy responses on the part of national policy and regulatory authorities. It failed to enforce regulatory standards set by standard-setting bodies that were agreed internationally. When the current crisis broke, it failed to organize global efforts to manage the crisis in a coordinated manner. The deepening of the crisis has underscored the urgency of global regulatory reform. Many international forums and international financial institutions have responded to the urgency by proposing an extensive array of global financial reforms.<sup>1</sup> Among these forums, the G-20 has been at the forefront in leading reforms at the national and global levels.<sup>2</sup>

Unlike in previous financial crises, advanced countries have suffered as much as emerging economies from this crisis, largely because it started in the United States and then spread to all parts of the global economy. For this reason, advanced countries have taken the initiative in reforming the global as well as their own regulatory systems. Because of this focus, most of the reports that have been issued do not specifically address the regulatory issues confronting emerging and developing economies. For their part, emerging economies, preoccupied with domestic economic issues, have not shown much interest in global regulatory reform. This is unfortunate because they have not been immune to the collateral damage of the crisis, and the proposed reforms will have far-reaching implications for the restructuring and management of their regulatory systems as well.

During the Asian crisis of 1997–98, East Asia's emerging economies except for China sustained heavy losses in output and employment, as they were unable to fend off what was essentially a capital account crisis. In the aftermath of the Asian crisis, they were subject to a large array of financial and corporate sector reforms, all of which were designed to prevent and improve the management of future crises. Ten years later, before the eruption of the current crisis, there was general consensus that East Asia's emerging economies had made great strides in their reform (see, for example, Gosh 2006). Yet the contagion of the current financial crisis has been as painful as that of the homegrown capital account crisis of 1997 and 1998.

During the height of the crisis in the fourth quarter of 2008, some countries such as the Republic of Korea saw their financial systems pushed to the brink of insolvency despite the fact that they had ample foreign exchange reserves (\$260 billion or 24 percent of gross domestic product, GDP, in Korea) at the beginning of the crisis. These economies have recovered from the liquidity crisis rather quickly, but the crisis is far from over, and their turnaround should not be taken as *prima facie* evidence that further financial reform is not needed.

This paper analyzes the causes and consequences of the contagion of the global financial crisis—in particular, the reserve currency liquidity crisis—with a view to identifying an agenda for reform of domestic, regional, and global regulatory systems from the perspective of East Asia’s emerging economies. One of the major culprits in the current liquidity crisis is the mismatched maturity of *foreign assets and liabilities* in bank balance sheets.<sup>3</sup> As Brunnermeier and others (2009, 38) point out, maturity mismatches are not confined to emerging economies. In fact, the mismatch “has been the main source of instability in this and previous financial crises.”<sup>4</sup> In emerging economies the maturity mismatch can have more serious consequences, as it invariably entails a currency mismatch and is exacerbated by procyclicality of capital flows.

The vulnerability of emerging economies to the twin crises is not new. What is new is that some of the existing evidence suggests that, contrary to conventional wisdom, a large reserve holding, a more flexible exchange rate system, current account surpluses, and regulatory restrictions limiting the incidence of maturity and currency mismatches in bank balance sheets have not provided emerging economies with a sturdy shield against external shocks such as the U.S. subprime crisis.

This paper argues that the two balance sheet mismatches arise mostly from normal banking operations and hence are largely unavoidable and that domestic regulations alone are not going to be the most effective way of preventing them, more so when cross-border financial transactions are fully liberalized. What is needed are new global institutions, new financial supervision and regulation, and a global lender of last resort.

These new institutions need to be complemented by the prudential regulation of capital movements in emerging economies. Past experiences with global regulatory reform cast doubt as to whether the new system could be established in the first place and, if created, whether it could be effective. If it could not be created, then second-best solutions will have to be found at the regional level to help emerging economies prevent or manage future crises better.

The paper examines the impact of the global economic crisis on East Asia, provides data on the degree of the two mismatches in several of East Asia’s emerging economies, discusses why the regulatory restrictions on the two mismatches have not been enough to mitigate the impact of the crisis, and explores the areas where further reforms are called for in the national, regional, and global financial systems. A final section concludes.

## **Impact of the Global Economic Crisis on East Asia’s Financial Markets and Institutions**

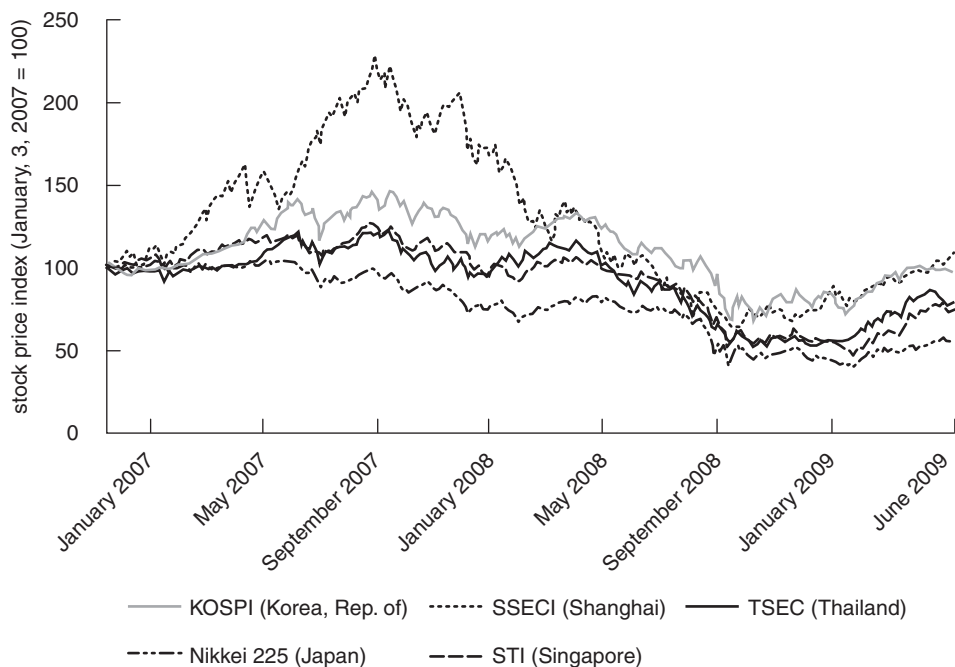
Amid the deepening global economic crisis, East Asia appeared to have been better sheltered from the global crisis than other regions as late as November 2008. Many forecasts including the November update of the *World Economic Outlook* (IMF 2008) were upbeat about East Asia’s prospects, suggesting that, as a whole, the region would deliver robust growth, while the United States and the euro area

would struggle with a contraction of their economies in 2009. These optimistic forecasts, however, turned out to be premature and had to be revised downward to project a dismal outlook for 2009.

For more than six months after the collapse of Lehman Brothers in September 2008, the worsening of the global financial crisis led global investors and lenders to deleverage and seek a safe haven in U.S. treasuries, thereby causing equity flows and bond issuance to plunge in global capital markets and curtailing the availability of short-term finance in emerging Asia. As a result, stock prices nosedived throughout the region (see figure 1), and exchange rates, except those pegged to the U.S. dollar, experienced a sharp depreciation against the major currencies and exhibited a higher degree of volatility than before (see figure 2). The sovereign spreads widened, and the quality of their financial liabilities denominated in U.S. dollars measured by the credit-default swap (CDS) spreads also deteriorated before starting to improve in February 2009 (see figures 3 and 4). In this bleak landscape of crisis, banks and other financial institutions pulled back from their lending operations by recalling existing loans instead of granting new ones, as the availability of both local and foreign currency liquidity evaporated, future economic prospects looked dim, and losses piled up.

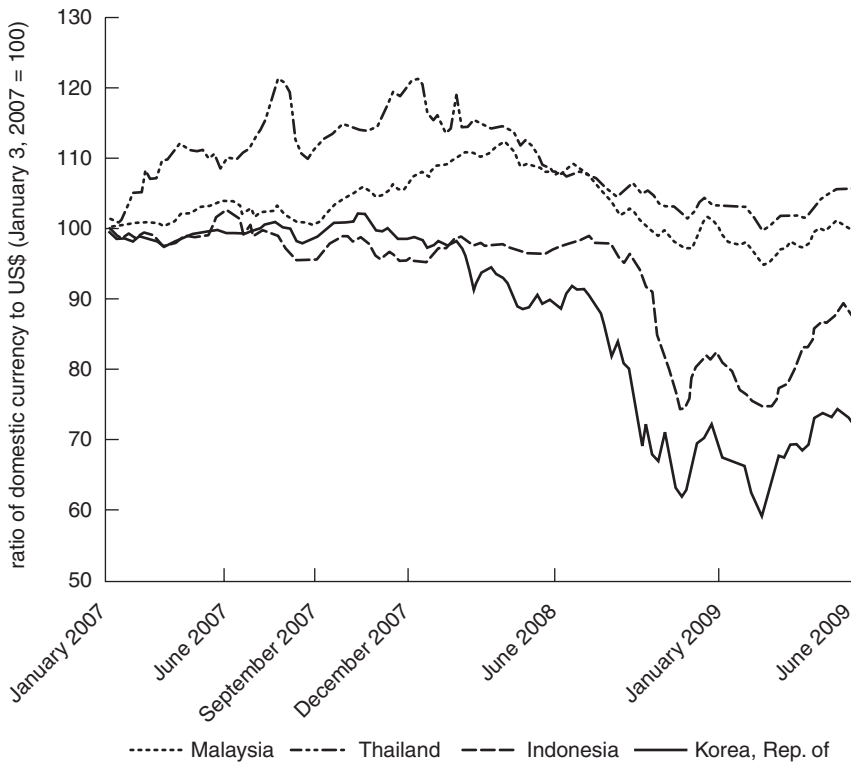
The earlier optimistic forecast rested on some of the unique features of East Asia. Unlike the 1997–98 Asian crisis, the current crisis was an external shock, with the epicenter located in the United States. East Asia’s economic fundamentals were reck-

**FIGURE 1.**  
Movements in Stock Price Indexes in East Asia, 2007–09



Source: Asia Regional Integration Centre, Asian Development Bank, Economic and Financial Indicators database, [http://aric.adb.org/macro\\_indicators.php](http://aric.adb.org/macro_indicators.php).

**FIGURE 2.**  
**Exchange Rates against the U.S. Dollar in East Asian Economies**



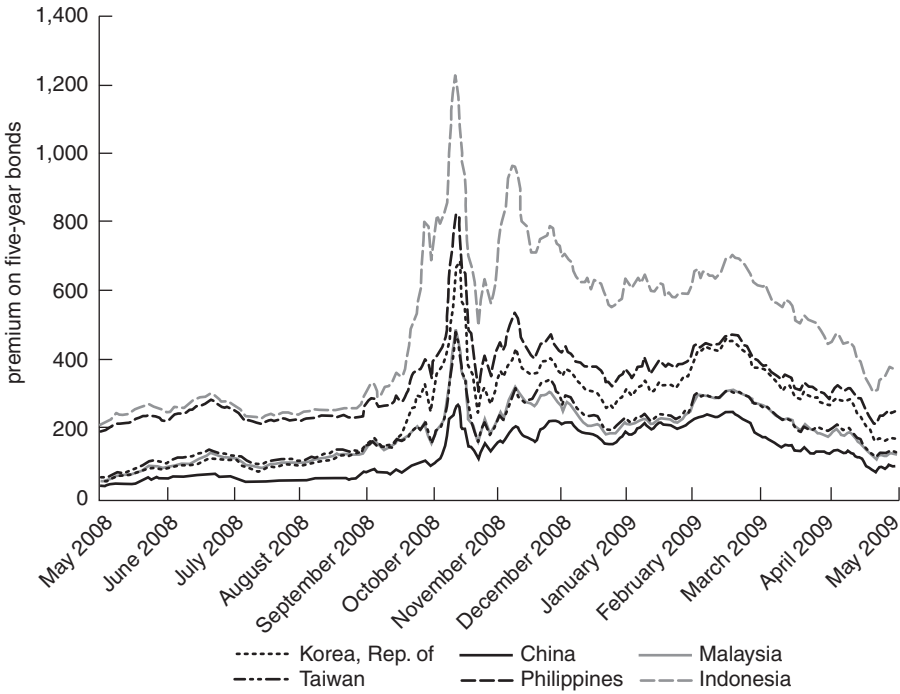
Source: Asia Regional Integration Centre, Asian Development Bank, Economic and Financial Indicators database, [http://aric.adb.org/macro\\_indicators.php](http://aric.adb.org/macro_indicators.php).

oned to be sound. Compared to those in Europe, the region’s financial institutions were healthier and more profitable because they held fewer U.S. toxic assets. Most countries in the region were also running current account surpluses and accumulating large amounts of foreign exchange reserves. Capping it all, the decoupling of East Asia from the cyclical movements of the rest of the world seemed to have taken root (Anderson 2007; World Bank 2007). Yet by January 2009 it looked as though the sky was falling, and much of East Asia slid into a deeper recession.

To the surprise of many, however, the gloomy outlook did not last long. Since April 2009, emerging East Asia has sprung back, returning to rapid growth and providing hope that the region will lead the global economy out of the crisis.<sup>5</sup> Debate on the decoupling of East Asia from the consumers of the United States and Europe has been rekindled, as emerging Asia staged an impressive recovery from the crisis in 2009 (IMF 2010).

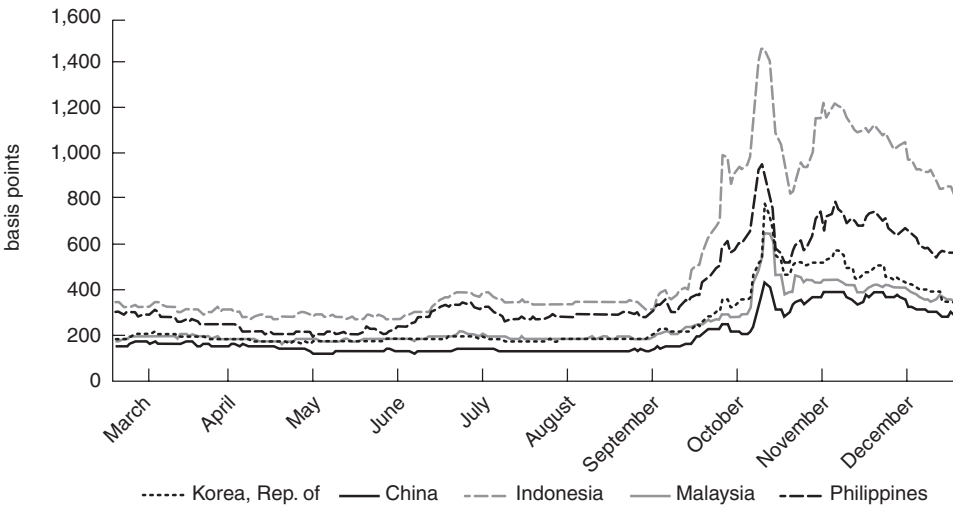
The severity of the impact of the crisis has varied from country to country. China does not appear to have been affected by the global recession: it posted 9.1 percent growth in 2009. The five original members of the Association of South East Asian Nations (ASEAN) have held up much better than neighboring countries, registering

**FIGURE 3.**  
**CDS Premium in East Asia, 2008–15**



Source: Korea Center for International Finance.

**FIGURE 4.**  
**Sovereign Spreads in East Asia, 2008: Foreign Currency–Denominated Sovereign Bond Spreads (versus U.S. Treasury Note)**





1.7 percent in the same year. Asian newly industrialized economies—Hong Kong, China; Korea; Singapore; and Taiwan, China—have managed a strong rebound.<sup>6</sup>

The impact of the global economic crisis has been transmitted to East Asia through trade and financial market channels. On the trade channel, the sharp decline in exports to the markets of the United States and European Union has been the main culprit in the current economic slowdown. On the financial channel, the region's growing and diversified financial ties with the global financial system have allowed turbulence in a financial center country to be passed quickly to the region, destabilizing East Asia's financial markets and institutions.

As a whole, East Asia is a net lender to the rest of the world, but this position has hardly assured East Asia of its ability to ward off an external financial crisis. The reasons are twofold. One is that East Asia has been importing safe financial assets to augment its foreign exchange reserves while exporting risky ones (Crockett 2000). Given this asymmetry, capital will flow out of the region as a result of global deleveraging and the flight to quality of both foreign and domestic investors in search of less risky assets. East Asian governments have amassed large amounts of foreign reserves, the bulk of which are held in safe assets such as U.S. treasuries. Since the 1997–98 crisis, East Asian banks and financial institutions have become more risk averse in managing their assets and liabilities. They also have been subject to more stringent supervision and regulations designed to safeguard their soundness and safety.

Due in part to these developments, the share of foreign financial instruments in bank portfolios has been relatively small in general; smaller still has been the share of risky structured over-the-counter products, simply because the net return (adjusted for funding cost) on lending to local borrowers has been higher than the return on assets denominated in U.S. dollars or euros. As a result, when the crisis erupted, investors from outside the region began divesting themselves of risky East Asian assets, but East Asian investors—private as well as institutional—have not retreated from global markets simply because they are holding mostly relatively risk-free dollar- and euro-denominated assets. The consequence of this asymmetric diversification has been a steep decline in capital inflows into the region.

Another reason for East Asia's inability to fend off the crisis stems from its heavy dependence on global financial intermediation conducted mostly in reserve currencies—the U.S. dollar and euro—and dominated by global financial institutions and markets located in the United States and Europe. Under these arrangements, when foreign lenders and investors sell off their East Asian assets and refuse to renew their short-term loans, East Asia's financial institutions and markets, unlike those of the United States and European Monetary Union members, cannot make up for the shortages of liquidity denominated in reserve currencies. Because of this inability, the squeeze on U.S. dollar liquidity has inflicted a great deal of damage on the wider economy and deepened the recession, bringing about the collapse of foreign currency lending, including trade financing, which has threatened the solvency of many East Asian banks unable to roll over their external loans.

In the face of dwindling reserve currency liquidity, East Asian banks could liquidate some of their holdings of foreign assets, but, since they did not hold many of these assets, liquidation could not cover the loss of liquidity. Furthermore in some

countries—notably Korea and Singapore—a growing share of bank liabilities consisted of short-term loans from foreign banks and wholesale market funding, whereas a large share of their assets, including loans to local borrowers, had longer maturity. This maturity mismatch between foreign assets and liabilities exacerbated the liquidity crunch, exposing the entire financial system to a systemic risk of insolvency and eventually a run on central bank reserves—that is, a currency crisis.<sup>7</sup>

## How Serious Were Maturity and Currency Mismatches in East Asia?

During the 1997 Asian crisis, currency mismatches between foreign currency assets and liabilities in bank balance sheets were the major financial vulnerability of Asian banks that exacerbated, if not triggered, the financial meltdown. Various studies argue that currency mismatches played a central role in the 1997–98 Asian financial crisis (Chang and Velasco 2000; Corsetti, Pesenti, and Roubini 1999; Rodrik and Velasco 1999). Goldstein and Turner (2004) argue that all prominent financial crises in emerging economies in the 1990s and early 2000s share one striking characteristic: a large currency mismatch. Most of these studies find the causes of the currency mismatch in market failures associated with asymmetric information and moral hazard. In the 2008–09 crisis, currency mismatches have been relatively mild compared to the massive deterioration in the run-up to the 1997–98 crisis, although the same cannot be said about maturity mismatches.

Maturity mismatching has been a major cause of the crisis not only in emerging but also in advanced economies. Brunnermeier and others (2009) point out that one of the most critical lessons of the 2008–09 crisis is that maturity mismatch—short-term funding of long-term assets with potentially low market liquidity—is a main source of financial instability. In emerging economies with foreign currency liabilities, maturity mismatches create a more serious systemic risk because they are invariably accompanied by currency mismatches.

### *Causes of the Two Mismatches*

There are three major causes of the twin mismatches in emerging economies. One is the role of banks in the transformation of debt maturity, another is procyclicality in bank lending and borrowing, and the third is relationship banking, in which banks establish long-term relationships with their loan customers.

#### *Debt-Maturity Transformation*

All banks, whether they are operating from advanced or emerging economies, are essentially engaged in debt-maturity transformation. Banks earn a substantial share of their profits by borrowing from the short end of the financial market (for example, accepting short-term deposits and issuing certificates of deposit) and lending long (for example, extending mortgages to households and loans to business firms for long-term investment in addition to short-term working capital).<sup>8</sup> According to Allen and Gale

(2007, 59), the maturity mismatch “reflects the underlying structure of the economy in which individuals have a preference for liquidity but the most profitable investment opportunities take a long time to pay off. Banks are an efficient way of bridging the gap between the maturity structure embedded in the technology and liquidity preference.”

It would be reasonable to assume that under normal circumstances, an individual bank would have an adequate base of deposits and access to wholesale funding markets to finance its long-term loans and investments in securities. In fact, most banks would make the same assumption because they would suffer a competitive disadvantage otherwise. However, in a crisis situation, when depositors leave banks en masse and liquidity in short-term funding markets dries up suddenly, banks often have no choice but to turn to the central bank—lender of last resort—for rescue financing.

### *Procyclicality*

The twin mismatches are often exacerbated by the procyclicality in the lending behavior of banks and other financial institutions (Crockett 2000; Borio 2003; White 2004). When the economy enters an upswing phase of the business cycle, financial institutions expand their lending more than before in the belief that the credit risk of their loans has decreased, with the bulk of funds raised from relatively cheaper wholesale funding markets at home and abroad. During the expansionary phase, lending for the financing of housing and commercial real estate is often the major cause of a boom and a bubble in the real estate market. The credit expansion feeds and is often fed by the real estate market boom. Banks and other financial institutions may realize that their excessive lending may indeed create an asset market boom, sowing the seeds of a bubble, which will eventually burst. It would be in their interests to restrain their lending collectively, but there is no market mechanism capable of bringing about such collective actions among financial institutions.

Eventually the expansionary phase or the boom comes to an end, and the economy cools off. At this point, financial institutions become conscious of the potential increase in the credit risk of their loans and begin to recall the existing loans, while refusing to extend new credit as the price of assets, which are in part held as collateral, begins to fall. For an individual institution, cutting credit exposure is a rational decision, but if all institutions do the same, they end up deepening the contraction.<sup>9</sup>

Over the business cycle, the procyclicality aggravates the two mismatches and amplifies the boom-bust cycle in the market for bank loans. During the boom period, banks have incentives to rely more on short-term funding, as the yield curve is upward sloping. Banks borrow more in volume and from the short end of both domestic and international money markets. The maturity and currency mismatches deteriorate. During a downturn, they do the opposite. But domestic banks and other financial institutions cannot easily recall their foreign currency loans to local customers, and they find it difficult to roll over their borrowings from foreign lenders. As a result, net capital inflows decline sharply, exacerbating the currency mismatch and possibly provoking a reserve currency liquidity crisis. As shown by Kaminsky, Reinhart, and Vegh (2004), Contessi, DePace, and Francis (2008), and Cardarelli, Elekdag, and Kose (2009), capital flows in emerging markets tend to be procyclical.

During the downturn, the central bank is expected to loosen monetary policy to prevent credit contraction and allow the foreign exchange rate to depreciate. However, expansionary monetary policy can be counterproductive, as it induces further capital outflows. In most emerging economies, equity flows, which account for a large share of capital flows, are insensitive to changes in the exchange rate, so currency depreciation does not significantly restrain capital outflows (Park 2009).<sup>10</sup>

Even when macroprudential supervision and other regulations have been in place, financial market deregulation and opening have exacerbated maturity and currency mismatches. Financial liberalization has led to the creation and rapid growth of a large variety of short-term money market instruments. Attracted by their relatively high yields, bank depositors have moved out of banks in increasing numbers and into money markets, thereby eroding the deposit base. With this erosion of the traditional funding base, banks have been forced to rely more on both domestic and international wholesale funding markets.

### *Relationship Banking*

Banks are in general relationship lenders. Banks develop close relationships with borrowers over time to facilitate monitoring and screening and to overcome problems of asymmetric information. When they refuse to roll over short- as well as long-term loans, they run the risk of losing their loan customers with good credit. Banks also know that most of their loan customers are so accustomed to the loan rollover that they are not prepared to repay their loans even when they are due, let alone pay them back before they mature. Therefore, until they exhaust all other options, banks do not consider refusing to renew most of their household and business loans. Instead, in order to avoid losing customers with a long-standing relationship and liquidating assets, banks turn to the central bank for liquidity support even at a penalty rate of interest.

If domestic currency liquidity is constrained, the central bank can avert a liquidity crisis by pumping more money into the economy. In contrast, when foreign currency liquidity dries up, banks run into the same difficulty: they are unable to sell foreign assets or recall foreign currency loans to their local customers. But unlike in the case of shortages of domestic currency liquidity, the central bank can meet only a limited amount of the increase in demand for foreign currency liquidity. In this case, banks run up both maturity and currency mismatches at the same time. When faced with a sharp decrease in net capital inflows, some individual banks may be able to avoid a liquidity crisis, but the financial system as a whole cannot.

### *Measurement of Maturity and Currency Mismatches*

In the aftermath of the 1997–98 crisis, East Asian economies—in particular those hit by the crisis—made concerted efforts to improve the efficiency and stability of their financial systems. Banks and non-bank financial institutions strengthened risk management, improved governance, and fortified themselves with equity capital more than what was needed to meet the Bank for International Settlements capital ade-

quacy requirements. On the macroeconomic policy front, they embraced more flexibility in managing the exchange rate system. To complement these reform measures, they also amassed large amounts of foreign exchange reserves for self-insurance against future crises. Yet they were hardly immune to liquidity risk when foreign lenders and investors liquidated their investments in the domestic financial assets of or refused to renew their loans to East Asian banks.

This section examines the scale and pervasiveness of currency and maturity mismatches in East Asia's banking industry, which may help to verify whether regulatory restrictions could relieve these balance sheet conflicts. Unfortunately, it is difficult to obtain the micro-banking data needed to estimate the extent of the two mismatches at the regional level. The variables chosen for the examination are at best crude measures of the extent of the two mismatches.

Table 1 presents aggregate effective currency mismatches (AECMs) of East Asia's emerging economies estimated by Goldstein and Turner (2004).<sup>11</sup> Recent figures are provided by Philip Turner at the Bank for International Settlements. The estimates show that Indonesia, Korea, the Philippines, and Thailand all blundered by letting the currency mismatch rise beyond a safe level in the run-up to the 1997–98 crisis. Since then, the AECM has gradually declined, while remaining in positive territory in most countries. Korea is an exception: its AECM has declined since 2005, turning negative in 2008 due to a sharp decline in net foreign assets. Reflecting the intensity of the 2008–09 global economic crisis, currency mismatching deteriorated in all of these ASEAN countries in 2008.

**TABLE 1. Aggregate Effective Currency Mismatch (AECM) in Select Asian Economies, 1994–2008**

Year	China	Indonesia	Korea, Rep. of	Malaysia	Philippines	Taiwan, China	Thailand
1994	3.4	-9.5	-0.5	3.5	1.6	4.7	-2.7
1995	3.7	-8.6	-1.3	2.3	0.8	3.7	-7.1
1996	4.9	-8.1	-5.3	1.5	-2.0	3.6	-10.7
1997	7.0	-21.6	-11.1	-0.9	-6.7	3.4	16.2
1998	6.1	-16.8	-3.0	2.3	-7.0	3.8	6.3
1999	4.6	-7.6	1.8	3.6	-6.9	3.8	-0.2
2000	3.8	-2.2	2.2	2.0	-11.7	2.6	1.1
2001	4.0	0.7	2.6	2.1	-14.8	4.7	3.0
2002	2.5	2.5	2.0	1.0	-14.6	7.2	3.9
2003	2.4	2.9	2.9	2.3	-18.6	12.0	3.9
2004	3.1	1.7	3.2	3.3	-16.7	11.8	3.4
2005	3.5	2.2	2.5	2.9	-14.0	11.0	3.7
2006	3.7	3.5	1.9	3.8	-5.8	9.1	4.2
2007	4.6	4.5	1.0	4.3	1.0	9.7	4.3
2008	—	3.0	-0.6	3.4	0.8	9.2	3.0

Sources: International Monetary Fund, Bank for International Settlements, and national data.

Note: This table updates table 4.5 in Goldstein and Turner (2004). — = not available.

As Goldstein and Turner admit, the AECM is an approximate measure. It does not fully reflect the scope of a liquidity crisis largely because it does not take into account differences in the maturity of foreign assets and liabilities. Even when the AECM is positive, a country can experience a foreign currency liquidity crisis if it is exposed to a large maturity mismatch between foreign currency assets and liabilities. To make it more practical, therefore, the AECM needs to be adjusted for the maturity mismatch.

Unfortunately, much of the micro-banking data needed to construct a measure of mismatch for all East Asian countries are not readily available. In their absence, this paper uses changes in the loan-deposit ratio and short-term foreign liabilities relative to foreign exchange reserves to qualify rather than quantify the extent of maturity mismatch. In general, a rise in the loan-deposit ratio indicates that banks rely more on both domestic and foreign wholesale market funding than on core deposits.

An increase in short-term foreign liabilities relative to foreign exchange reserves is likely to be the result of an increase in banks' external funding from the short end of global financial markets. Here one could use the volume of total foreign liabilities rather than the level of foreign exchange reserves as a scale variable. This paper chooses the latter because the ratio of short-term foreign liabilities to foreign exchange reserves is also regarded as a measure of an adequate amount of foreign exchange reserves to be held in emerging economies. A large increase in the share of short-term external indebtedness may worsen currency mismatching but may not necessarily set off capital outflows and a liquidity crisis if a country holds a large amount of foreign exchange reserves.

As shown in table 2, loan-deposit ratios have been stable and have remained well below 100 percent in most countries, suggesting that as a whole, East Asian banks have had a sufficient base of deposits to meet the local demand for loans. Exceptions are Korea and Thailand, where the ratios climbed up to 127 and 105 percent, respec-

**TABLE 2. Loan-Deposit Ratio in Select Asian Economies, 2000–08**

*percent*

Year	China	Indonesia	Korea, Rep. of	Malaysia	Philippines	Singapore	Taiwan, China	Thailand
2000	80.3	37.3	87.1	84.3	76.1	87.8	83.0	93.3
2001	78.2	38.0	88.7	85.9	74.0	87.3	75.1	84.1
2002	76.8	43.2	97.1	84.9	70.8	87.8	72.3	88.1
2003	76.4	48.5	101.2	80.9	72.3	86.3	73.4	85.9
2004	73.7	57.4	101.5	78.6	65.7	84.2	77.6	89.2
2005	67.8	60.8	103.6	77.5	63.5	79.5	79.8	88.6
2006	67.2	60.6	112.3	70.8	59.0	69.2	79.2	86.9
2007	67.2	65.1	128.7	72.2	58.5	71.2	80.4	91.4
2008	65.1	73.2	127.4	73.5	58.4	75.6	75.6	105.0

Source: Bank for International Settlements, International Monetary Fund, Organisation for Economic Cooperation and Development, and World Bank data.

tively, in 2008. And Indonesia saw a large hike in 2008, with the ratio rising to 73 percent, up from 65 percent the preceding year.

On the external liability side, short-term foreign indebtedness as a proportion of foreign exchange reserves in some of the East Asian countries where data are available has been well below the level prescribed by the Greenspan-Guidotti-Fischer (GGF) rule, which is to hold an amount of reserves equal to the country's short-term foreign currency liabilities, a level sufficient to fend off a speculative attack (see tables 3 and 4). The definition of short-term foreign liabilities varies from data source to source. Here two sets of data from two different sources are presented for comparison. The ratios have risen substantially in Indonesia, Korea, and Singapore but have remained below 100 percent.<sup>12</sup>

The two ratios, together with changes in the AECM, suggest that except for Korea, Indonesia, and possibly Singapore, other countries have so far remained outside the danger zone of a currency crisis. But the 2008–09 global financial crisis is far from over and could flare up again, depending on the effectiveness of international efforts to stimulate the global economy.

**TABLE 3. Short-Term Foreign Liabilities as a Percentage of Foreign Exchange Reserves in Select Asian Economies, 2005–08**

Year	China	Indonesia	Korea, Rep. of	Malaysia	Philippines	Singapore	Taiwan, China	Thailand
2005	14	85	31	17	56	142	29	31
2006	13	77	48	14	39	162	30	27
2007	10	41	61	16	38	170	37	25
2008	9	73	75	19	33	183	36	22

Sources: Bloomberg and Fitch.

**TABLE 4. Short-Term External Liabilities as a Percentage of Foreign Exchange Reserves in Select Asian Economies, 2000–08**

Year	China	Indonesia	Korea, Rep. of	Malaysia	Philippines	Singapore	Taiwan, China	Thailand
2000	12.9	74.3	43.5	29.1	63.4	84.1	12.3	39.9
2001	10.4	63.8	40.2	31.7	69.6	89.9	9.7	36.4
2002	7.3	43.9	36.9	30.2	57.0	71.7	8.6	25.8
2003	7.7	38.5	34.6	24.6	83.8	58.8	12.1	24.8
2004	7.0	47.6	28.6	26.4	74.9	60.8	16.1	22.8
2005	7.7	56.4	29.9	24.9	80.2	71.6	15.0	25.3
2006	7.5	53.8	42.0	27.6	52.1	75.5	12.5	22.2
2007	8.0	53.2	56.5	22.4	43.4	79.8	13.7	11.6
2008	5.4	57.1	58.1	24.0	24.5	67.8	8.5	9.9

Source: Bank for International Settlements, International Monetary Fund, Organisation for Economic Cooperation and Development, and World Bank data.

## Can Maturity and Currency Mismatches Be Mitigated by Regulation?

Banks are drawn into currency mismatches because they finance some of their local currency loans with foreign currency funds; even when they relend foreign currency funds to their local customers, they often commit a currency mismatch because local borrowers include not only exporters with foreign currency cash flows but also importers without such flows, and those borrowers in foreign currency are not prepared for an unexpected recall or denial of the rollover of their loans. The maturity mismatch makes banks vulnerable to a sudden change in the demand for liquidity. However, this is not the end of the story. When combined with a currency mismatch, maturity mismatch can easily cause the local currency to depreciate. The weakening of the currency then worsens currency mismatching further and could trigger a currency crisis.

### *Private Precautionary Measures*

Banks in East Asia, in particular those susceptible to the twin mismatches, are required to take precautionary measures to avoid liquidity risks. In general, individual banks have four options to consider when preparing for and managing foreign currency liquidity shortages: (a) holding reserves in terms of liquid foreign assets, (b) securing contingent lines of credit from foreign banks, (c) securitizing and marketing in global financial markets their loans to local customers, and (d) obtaining foreign currency loans from the central bank. Will these precautionary measures be reliable and effective in guarding against a reserve currency liquidity crisis? Will they help to prevent a systemic risk such as a run on central bank reserves?

On the first option, the share of foreign securities held by banks in East Asia's emerging economies is relatively small. This is because the net return on investing in these assets is likely to be low, as their funding costs are higher than those of their competitors from advanced economies. They will find it more attractive to extend foreign currency loans to domestic customers instead of investing in short-term foreign financial instruments. Furthermore, liquidation of these assets would incur heavy losses since they are likely to be sold at fire-sale prices if they can be sold at all. This option has systemic implications in that if all banks try to sell their foreign assets, liquidity shortages will be worse for the banking sector as a whole.

As for the second option, the fee for contingent credits to be drawn in case of a financial crisis could also be high, as it is likely to reflect the solvency risk to which banks from emerging economies are exposed. More important, contingent lines of credit may spare individual banks a liquidity crisis, but not the entire banking sector. When foreign banks conduct their lending operations within a preset country exposure, they are likely to recall other loans or refuse to extend new loans to compensate for the drawdown of contingent credits.

The third option is also costly. In theory, some of the local as well as the foreign currency loans to local borrowers held in bank portfolios could be securitized and insured by mono-line or multi-line insurers via the CDS market. It is not clear



whether banks can remain competitive if they have to bear a high CDS spread for the securitization. In most emerging economies, securitization of loans and other assets is a new financial innovation in which banks have little expertise. Even if some of their foreign currency loans to domestic borrowers can be securitized, market prices of these derivative products may not be high enough to cover the funding cost when credit and currency risks are priced properly into the values of these instruments.

For example, Korea's largest commercial bank, Kookmin Bank, raised \$1 billion by the sale of covered bonds in May 2009.<sup>13</sup> Its five-year, 7.25 percent notes were priced to yield 500 basis points more than the mid-swap rate.<sup>14</sup> By then, Korea had largely overcome the liquidity crisis, yet it still had to pay a high cost of borrowing.<sup>15</sup> Even when some of the banks are able to issue securitized products, the systemic risk for the economy as a whole cannot be shifted to foreign investors and lending institutions. This is because foreign holders of these securitized products are likely to dump them, causing a free fall of their prices. The depressed prices will be taken as an indication that the crisis in the country where the products were issued is deeper than expected. This expectation will then provoke further outflows of capital.

Finally, on the last option, the central bank does not stand ready to rescue banks beleaguered by liquidity shortages even when it holds large amounts of foreign exchange reserves simply because it cannot assume the role of a lender of last resort for reserve currency liquidity.

If none of these precautionary measures is available, banks faced with a liquidity crisis will herd into the local foreign exchange market to buy dollars and euros, thereby weakening the local currency. Depending on the expectations of future currency movements, the initial depreciation could precipitate currency speculation, touching off a run on the central bank's foreign exchange reserve. This could happen if foreign investors head to the exit all at once or if foreign banks suddenly stop rolling over their short-term loans.

## Regulatory Restrictions

A strict regulation designed to prevent currency mismatches would dictate that bank lending and debt contracts be made in the currencies in which deposits are denominated and in which customers earn revenues.<sup>16</sup> In an extreme case, loans to local customers who earn revenues in a local currency should be excluded from banks' foreign currency lending. Would such a regulation be desirable or, which is more important, enforceable?

According to Goldstein and Turner (2004), regulatory restrictions could be a practical means of mitigating currency mismatches. They propose restrictions such as imposing limits on net foreign exchange positions, foreign exchange liabilities, and bank holdings of foreign currency-denominated securities. They also recommend introducing more restrictive rules for managing liquidity risks and a higher reserve requirement on foreign currency deposits.

More specifically, these regulatory restrictions may include (a) linking the class of assets for which short-term funding is secured to the maturity of the funding, for example, by allowing banks to hold only short-term safe and liquid assets for short-term funding,<sup>17</sup> and (b) imposing a capital charge on financial institutions with funding liquidity risks stemming from the two mismatches (Brunnermeier and others 2009). In a crisis situation, these prudential regulations are likely to be ineffective, as the Korean experience shows.

Is the regulation enforceable? In order to alleviate the twin mismatch problems, Korea's Financial Supervisory Service (FSS) imposes a foreign currency liquidity regulation in which banks are required to relend in foreign currencies to local borrowers for a minimum of 85 percent of their foreign currency funds maturing within three months (15 percent for domestic currency loans). The maturity of the local foreign currency loans must also be less than three months. In order to prevent the currency mismatch, the FSS also enforces another liquidity restriction in which banks are required to keep the ratio of net short-term foreign currency assets maturing within seven days to total foreign-currency assets at a positive level and the ratio of foreign currency assets maturing in less than 30 days to total foreign currency assets at minus 10 percent.

Banks do comply with these regulatory measures on their balance sheets, but not in reality. Indeed, if these prudential measures had been observed to the letter, Korea should have avoided the run on central bank reserves during the fourth quarter of 2008. But it could not. When global short-term money markets froze, it ran into a serious liquidity squeeze. It appears that banks' compliance did not prevent, or even moderate, the pervasiveness of the two balance sheet mismatches, largely because the banks kept on renewing their domestic and foreign currency loans regardless of their maturities, with the expectation that they would have continuing access to global wholesale funding markets.

This lax attitude to compliance does not necessarily reflect a serious moral hazard on the part of Korean banks, because, if past experience with the 1997–98 financial crisis is any guide, they know that the government could not come to their aid in a crisis caused by the drought of reserve currency liquidity. Instead, it may have more to do with relationship banking and reflect the fact that compliance means the loss of their competitiveness vis-à-vis their foreign competitors in global financial intermediation.

Banks in reserve currency countries are not subject to these and other restrictions recommended by Goldstein and Turner, because these central banks can always print more money to thwart an impending liquidity crisis caused by a rise in maturity mismatch. Therefore, if carried out too tightly, the regulations in emerging economies could be counterproductive, as they run the risk of limiting the ability of even well-managed banks to compete and to participate in international financial intermediation.

If the regulatory restrictions prove to be ineffective, governments of emerging economies may invoke more direct measures such as providing government guarantees on foreign loans and imposing capital controls. On the government guarantee, a recent Korean experience is instructive. On October 12, 2008, when Korean banks were not able to renew their short-term external loans, the Korean government sought

to restore investor confidence by issuing sovereign guarantees on up to \$100 billion of new foreign loans maturing before the end of June 2009. Similar guarantees had failed to allay fears of financial meltdown at the beginning of the Asian crisis in 1997, and they failed again. As they had done in 1997, the markets reacted with indifference.

When Korea secured a swap line amounting to \$30 billion from the U.S. Federal Reserve on October 30, 2008, the foreign exchange market settled down somewhat, but not for long. The foreign exchange rate shot up to ₩ 1,509 per dollar three weeks after the swap was announced, which was apparently not enough to remove uncertainties surrounding Korea's ability to service its foreign debt. On December 13, Korea also managed to arrange won–local currency swaps with the central banks of both China and Japan, each amounting to an equivalent of \$30 billion. These measures did not help, but when it became clear that the U.S. Federal Reserve would renew the swap agreement, foreign investors' confidence in the Korean economy improved, and the foreign exchange market stabilized toward the end of the first quarter of 2009. This is not the place to discuss the benefits and costs of capital controls, but national policy authorities will not stand idly by.

The twin mismatches render these economies highly susceptible to a reserve currency liquidity crisis. In contrast, most advanced countries, in particular reserve currency countries—the United States and members of the European Monetary Union—are largely free from currency mismatches and hence spared the systemic risk of a currency crisis, although they could still suffer a liquidity crisis. This reserve or key currency privilege puts banks in advanced economies at a competitive advantage in international financial intermediation. From the emerging economies' point of view, this bias, which is equivalent to a non-reserve currency premium for external borrowing to emerging economies, raises the question of unfairness—not to mention the rationale for integrating into the global financial system—to the extent that it creates an uneven playing field in international intermediation business.

## Financial Reform: Where and How?

The financial history of the global economy documents a long list of financial crises that have erupted in both advanced and developing countries over the last 400 years (Allen and Gale 2007). This history leaves little doubt that bubbles, excessive exuberance, and crashes are intrinsic features of the market-oriented Western financial system. The current financial crisis will not be the last one the global economy will ever encounter.

Over the past two decades, more and more emerging economies have moved to liberalize their financial markets and integrate their financial intermediation industries into the global financial system, thereby broadening and deepening financial globalization. Whatever its benefits may be, integration with the global financial system has been accompanied by financial instability, as emerging economies are finding it increasingly difficult to deflect adverse external shocks emanating from speculative activities in international financial markets even when their exchange rates are freely floating.

For the efficiency of the global financial system, market globalization needs to be backed by the globalization or even harmonization of financial supervision and regulation and the creation of a global lender of last resort. A global regulatory institution could help to uncover financial market risks that require policy responses on the part of national policy and regulatory authorities. It could enforce uniform global regulatory standards to minimize regulatory arbitrage arising from the existence of different regulatory systems in different countries. It could mobilize coordinated global efforts to prevent a crisis from spreading in a country or region to other parts of the world. Runs on banks and central bank reserves in emerging-market economies caused by excessive speculation, panic, and herding among market participants can only be averted or at least better managed if there were a global lender of last resort.

Despite the repeated calls for more effective and coordinated global responses to financial crises, past experiences with global financial reform cast doubt as to whether these global institutions could be established in the first place and, if they were created, whether they would be effective in improving global financial governance. Creating a globally integrated regulatory system is highly unlikely because there is no one-size-fits-all regulatory institution appropriate to advanced, emerging, and developing economies alike and because financial regulation and supervision come naturally under the purview of national governments insofar as they are required to pay for the cost of crisis resolution. Ten years after creating the euro, the European Monetary Union member countries have yet to unify their national regulatory systems.<sup>18</sup>

If creating a global regulatory institution is impractical, what is the second-best solution? According to the G-20 (Financial Stability Board 2009), it is to raise global financial standards in a consistent way that ensures a level playing field and avoids fragmentation of markets, protectionism, and regulatory arbitrage. To this end, the Financial Stability Board (FSB) expects to put in place a framework to strengthen adherence to international regulatory and prudential standards by the end of 2010. It is also expected that the FSB members will implement international financial standards and agree to subject themselves to periodic peer reviews.

But it is again unrealistic, and would be futile to attempt, to establish uniform regulatory standards acceptable to all countries regardless of their stage of financial development simply because many emerging economies may not yet have the institutional capacity to adopt and enforce global standards in line with country-specific needs. Recognizing this gap, the G-20 proposes that advanced economies, the International Monetary Fund, and other international organizations provide capacity-building programs for emerging-market economies and developing countries. Since capacity building is likely to take an extended period of time, the G-20 implicitly would allow emerging and developing economies to keep their current standards, even if they are not consistent with the new global standards to be introduced.

Will the new G-20 initiative bear fruits? It is too early to tell, but the disappointment with similar initiatives in the past does not bode well for its future success. After the Asian crisis of 1997–98, many international forums were established to create global standards on accounting, disclosure, risk management, and corporate

governance at banks and other financial institutions and also to set rules for financial supervision and regulation. Over time the memories of the crisis faded, and so did the initial thrust of these global initiatives.

In the preceding section it is argued that prevention of excessive maturity and currency mismatches is a top priority for regulatory reform in emerging economies. It requires keeping in check procyclicality of capital flows and cooperation with and support of financial policy and regulatory authorities of advanced economies. The G-20 supports higher capital requirements for risky products and off-balance-sheet activities and countercyclical capital buffers for moderation of procyclicality.<sup>19</sup> Holding the buffers is similar to dynamic provisioning, which requires banks to build up capital, put a brake on the expansion of bank credit during an expansionary phase of the business cycle, and reverse the process when the economy slows down.<sup>20</sup> It also supports the introduction of a leverage ratio as a supplementary measure to the Basel II risk-based framework. To ensure comparability, the details of the leverage ratio will have to be harmonized internationally, fully adjusting for differences in accounting.

Most emerging economies would, in principle, be in broad agreement with these G-20 proposals, but may not find them to be acceptable because they do not address the problem of the non-reserve currency premium they have to bear. Given the premium, the market will demand higher capital requirements and a higher leverage ratio than they do in advanced economies. For example, to alleviate the procyclicality, emerging economies will need to build larger reserves than advanced countries in an upturn of the business cycle, thereby undermining competitiveness of their financial institutions.

As for multilateral cooperation, emerging economies do not expect advanced countries to require their financial institutions to accept liabilities from abroad only if they are denominated in emerging economies' currencies. But they would benefit from the creation of a multilateral cooperative arrangement for supervision and regulation of financial institutions, which could facilitate exchanges of information between the concerned regulatory authorities from advanced and emerging economies. The cooperative arrangement could be structured and managed in a way that could facilitate and assist the joint supervision and inspection of both lenders from advanced countries active in emerging economies and systemically important borrowers from emerging economies.

For example, when an emerging economy finds a large increase in maturity mismatching of foreign assets and liabilities in its financial institutions, there is the danger that domestic borrowers may commit excessive leveraging and foreign lenders may take undue risk. Under these circumstances, the emerging economy could turn to the new cooperative arrangement for joint supervision of both domestic borrowers and foreign lenders with the regulatory authorities of the countries where the external lenders operate. Such joint supervision may help to provide the emerging economy with the information it needs to take precautionary measures to moderate maturity and currency mismatches by stabilizing interregional capital flows.

Although the proposal is a modest one, it is highly uncertain whether such an institution will ever come into existence. In view of this uncertainty, it would be in the

interests of East Asia's emerging economies to participate actively and establish a united front in voicing their concerns and priorities in various international forums entrusted with the reform of the global regulatory system, including the G-20, the Financial Stability Forum, and the Basel Committee on Banking Supervision.

### *Regional Cooperative Arrangements*

If the prospects for reform of the global regulatory system are not promising, are there any regional arrangements for regulatory cooperation that may help to safeguard East Asia's emerging economies against turbulences of international finance? There is an East Asian regional cooperative arrangement known as ASEAN+3. Although it has a relatively short history, it has made considerable progress in strengthening regional cooperation by creating a regional liquidity support system under the Chiang Mai Initiative Multilateralization (CMIM).

At present, the CMIM does not play any role in coordinating financial supervision and regulation at the regional level, but it could, once it is armed with its own surveillance functions, which are planned to be added in 2010. ASEAN+3 could then establish a college of the region's supervisory authorities as an integral component of the CMIM. A regional college of supervisors would offer an effective way of improving communications among the supervisors of those systematically important multinational financial services conglomerates operating out of East Asia. To support the college in this role, the existing ASEAN+3 early-warning system could be improved to alert regulators and financial institutions to emerging risks, including those from macroeconomic trends and volatile capital flows in both the regional and global economies.

### *Regulatory Reform at the National Level*

It is obviously too early to conjecture the features of the new global regulatory system that may emerge from the ongoing discussions at the G-20 and other international financial forums. At this stage, therefore, it is premature and risky for East Asia's emerging economies to launch any major institutional and structural reform of the financial system independently of the financial reforms under way in the United States, Europe, and the G-20. They would be better advised to wait until the contours of new global financial regulations are clear. This does not mean that they can remain on the sidelines of the global regulatory reform efforts. Whatever global system is constructed, its effectiveness will be enhanced if it is complemented by broadening the scope and developing new instruments of domestic macroprudential supervision to bring under control the procyclicality of bank lending and capital flows.

Strengthening macroprudential supervision and expanding regional and global regulatory cooperation will help, but will not be enough to prevent future liquidity crises unless complemented by liquidity support from reserve currency countries. The U.S. dollar is a de facto global currency, and the euro has emerged as a distant-second reserve currency. As the providers of global mediums of exchange and stores

of value, the reserve currency countries need to bear responsibility for controlling and stabilizing the global supply of liquidity. In assuming their global role, the U.S. Federal Reserve (Fed) and the European Central Bank may consider institutionalizing a global currency swap network to be activated in a crisis situation. At present, the central banks of Canada, Japan, Switzerland, and the United Kingdom together with the European Central Bank have unlimited dollar swap lines with the Fed. The network membership could be enlarged to include, in addition to the current members, many of the emerging economies active in international financial markets. These emerging-market countries would then have access to swap lines that could provide short-term U.S. dollar or euro liquidity if needed to prevent a liquidity crisis.<sup>21</sup>

The severity and contagiousness of the current financial crisis have raised concerns that some of East Asia's emerging economies may decide to retreat from or at least reduce the speed and scope of financial market opening and integration into the global financial network. Such a decision would be premature and may not serve their interests in the long run. In contrast, other emerging economies have taken steps to liberalize and open their financial markets to facilitate internationalization of their currencies, with the expectation of enlarging the ability to borrow in their own currencies. Although the extent to which internationalization has relieved liquidity shortages in those countries with fully convertible currencies is unclear, it is a new avenue worthy of further research for some of the East Asia's emerging economies.<sup>22</sup>

## Concluding Remarks

The eruption of a crisis in the subprime mortgage market in the United States in 2007 has passed through to other advanced and emerging economies, causing a financial meltdown in advanced economies and subsequently setting off a severe recession throughout the global economy. Most of East Asia's emerging economies have been able to ride out the crisis relatively well. But it has been a painful reminder that strong economic fundamentals and a rational macroeconomic policy framework alone may not spare them from liquidity and currency crises precipitated by external shocks such as the U.S. subprime crisis, more so when their financial markets are integrated with the markets of the global financial system.

In order to avoid or mitigate maturity and currency mismatches, which have been some of the main causes of financial vulnerabilities, East Asia's emerging economies have imposed several micro- and macroprudential regulations on banks' asset-liability management. At the same time they have moved toward a more flexible exchange rate system, internationalizing their currencies, and accumulating large foreign exchange reserves. Nonetheless, these reform efforts and other precautionary measures have not been enough to prevent contagion of external financial crises, regardless of the location of their epicenter. When foreign investors and lenders suddenly and unexpectedly withdraw their loans and investments, emerging economies are unable to cover shortages of reserve currency liquidity, which

often trigger a currency crisis, especially when banks are exposed to high degrees of currency and maturity mismatches.

To be sure, maturity mismatches do not plague only emerging economies: they have been as pervasive in the banking industries of advanced countries as they have in other economies. In fact, the mismatching of maturity has been one of the major causes of the financial collapse in advanced countries in 2008. Unlike in emerging economies, however, maturity mismatch in advanced countries is not accompanied by a currency mismatch and hence does not provoke a currency crisis even when global liquidity evaporates. This is because the currencies of the United States and the members of the European Monetary system—the U.S. dollar and the euro—are international media of exchange held as foreign exchange reserves, and other advanced economies can borrow in their own currencies, which are internationalized, from international financial markets. This privilege constitutes a reserve currency benefit that puts advanced economies at a competitive advantage in international financial intermediation. In the absence of this advantage, emerging economies have to pay a premium for their external borrowing.

This disadvantage means there is no level playing field for banks from emerging economies that are engaged in international financial intermediation. This premium is exacerbated when restrictions on foreign currency borrowing and lending or requirements for hedging currency risk are imposed on their financial institutions because these regulations are then translated into a higher cost of funding from international financial markets. From the perspectives of emerging economies, unless institutional arrangements for global liquidity assistance—such as a global liquidity safety net, which is on the G-20 reform agenda—are established to enable them to prevent or better manage liquidity and currency crises, they may have to reexamine the costs and benefits of integrating into the global financial system.

## Notes

1. Work related to the regulatory reform is being carried out by many private and public institutions including the G-20, the European Commission, the Financial Stability Board, the International Monetary Fund, the Basel Committee on Banking Supervision, the International Organization of Securities Commissions, and the International Association of Insurance Supervisors. See, for example, FSA (2009), Financial Stability Board (2009), IMF (2009a, 2009b), de Larosière Group (2009), Brunnermeier and others (2009), Bank of England (2009), and Warwick Commission (2009).
2. The most extensive list of reform proposals can be found in Financial Stability Board (2009).
3. Maturity mismatches between assets and liabilities denominated in local currency could also give rise to a liquidity crisis, but such a crisis is within the capabilities of the central bank to resolve.
4. They do not make a distinction between local and foreign currency maturity mismatches.
5. According to a popular journal (*Economist*, April 15–21), the recovery has been astounding.
6. At this stage of the crisis, the episodes of the ongoing crisis do not provide empirical evidence either supporting or disputing the decoupling phenomenon as well as the notion that East Asia may help to lead a global economic recovery.



7. To be sure, East Asia's central banks can supply additional liquidity by running down their foreign exchange reserve holdings, which were known to be excessively large before the crisis, but if they do, they run the risk of provoking a run on their reserves if speculators start shorting the local currencies. Except for the yen, few East Asian currencies are internationalized in the sense that they are widely used to settle international transactions in financial assets as well as goods and services. East Asia holds collectively more than \$4 trillion in foreign exchange reserves, but it is not clear whether, except for China and Japan, other East Asian economies held enough reserves to ward off currency speculation at the height of the crisis in the fourth quarter of 2008.
8. Brunnermeier and others (2009) argue that there are many caveats to this generalization and that the mismatch is a matter of degree. The incentive to commit maturity mismatch is most pronounced when the yield curve is upward sloping in a boom.
9. This coordination failure may justify intervention on the part of policy authorities. Given the nature of its operations, the supervisory agency may be the authority to assume the market intervention.
10. The supervisory agencies are not specifically entrusted with stability functions; they may not have developed the expertise or culture of macroprudential orientation, while the central bank cannot exercise supervisory control at the level of individual institutions. These institutional constraints could hamper coordination of macroprudential policy, creating the danger that the policy authorities, including the ministry responsible for fiscal and exchange rate policy, will not be able to agree on the seriousness of financial distress once it arises and hence will fail to devise a collective policy response.
11. Goldstein and Turner (2004) were the first to develop a statistical measure of currency mismatch. They define an aggregate effective currency mismatch as follows:  $AECM = NFCA / XGS (FC / TD)$ , where  $NFCA$  = net foreign currency assets (+) or liabilities (-) and  $XGS$  = exports of goods and services (national income account); when  $NFCA$  is negative,  $MGS$  = imports of goods and services (national income account); when  $NFCA$  is positive,  $FC / TD$  = foreign currency share of total debt.
12. A recent Citibank study uses a reserve recovery ratio to measure foreign exchange reserve adequacy, which is defined as the ratio of reserves to the sum of short-term foreign debts by remaining maturity and expected current account surplus or deficit for the next 12 months. Estimates of these ratios for several East Asian countries show that at the end of 2008 Korea had barely enough reserves, with a ratio of 1.1 for 2009, whereas other countries had an ample cushion of reserves, with ratios ranging from 1.6 for Indonesia to 5.4 in Thailand (Huang 2009).
13. Covered loans differ from mortgage-backed securities in that they are secured by property loans or lending to public institutions and are backed by the borrower's guarantee to make payment.
14. Earlier in April 2009, Hana Bank, Korea's fourth largest bank, sold \$1 billion of three-year government-guaranteed notes priced to yield 490 basis points more than the mid-market swap rate.
15. The mid-market swap rate is the rate at which the discounted future values of the fixed and floating swap payments net to zero.
16. In addition to the regulatory restrictions, Goldstein and Turner (2004) recommend a managed floating foreign exchange policy to large emerging economies because it produces incentives for banks, non-bank financial institutions, and corporations to hedge currency risk in order to keep currency mismatches under control. However, a recent bout of currency speculation in Korea raises doubts about the extent to which free floating could relieve the burden of currency mismatches at banks and reduce the incidence of a currency crisis when expectations of currency speculators on the future exchange rate tend to be

- extrapolative. Holding large amounts of reserves more than what the G-G-F rule prescribes may help to avert a liquidity crisis. When the market sentiment builds up and expectations are firmly held, speculators can hold short positions of any size. In effect, a speculative attack is a run on the reserves of the central bank; the larger the reserves, the bigger the run. In this situation, prices of equities and bonds will continue to fall, and the exchange rate will continue to depreciate until the central bank runs out of its foreign reserves.
17. This is a version of mark to funding proposed by Brunnermeier and others (2009).
  18. A similar reasoning would conclude that there will not be a global lender of last resort as long as there are no global taxpayers.
  19. The G-20 also sees the need to improve the quality, consistency, and transparency of the Tier 1 capital base in a way that will allow harmonization across jurisdictions and comparisons across institutions to be easily made.
  20. The Basel Committee on Banking Supervision has stated that the level of capital in the banking system, both the minimum capital requirement and the buffers above it, will be raised relative to pre-crisis levels to improve resilience to future episodes of stress. This will be done through a combination of measures such as strengthening the risk coverage of the Basel II capital framework, improving the quality of capital, and raising the overall minimum requirement.
  21. There is concern that expanding the swap network could create moral hazard problems in emerging economies. But it is difficult to believe that emerging economies would be disposed to laxity in managing macroeconomic policy simply because they have access to the swap lines.
  22. See Hausmann and Eichengreen (2003) and Eichengreen, Hausmann, and Panizza (2003) for difficulties of borrowing in national currencies for emerging economies.

## References

- Allen, Franklin, and Douglas Gale. 2007. *Understanding Financial Crises*. Clarendon Lecture in Finance. New York: Oxford University Press.
- Anderson, Jonathan. 2007. "Is China Export Led?" UBS Investment Research Asian Focus, UBS Securities Asia, Hong Kong, September 27.
- Bank of England. 2009. "The Role of Macroprudential Policy." Discussion paper, Bank of England, London, November.
- Borio, Claudio. 2003. "Towards a Macroprudential Framework for Financial Supervision and Regulation?" BIS Working Paper 128, Bank for International Settlements, Basel, February.
- Brunnermeier, Markus, Andrew Crockett, Charles Goodhart, Avinash D. Persaud, and Hyun Shin. 2009. *The Fundamental Principles of Financial Regulation*. Geneva Report on the World Economy 11. London: Centre for Economic Policy Research.
- Cardarelli, Roberto, Selim Elekdag, and M. Ayhan Kose. 2009. "Capital Inflows: Macroeconomic Implications and Policy Responses." IMF Working Paper 09/40, International Monetary Fund, Washington, DC.
- Chang, Roberto, and Andres Velasco. 2000. "Banks, Debt Maturity, and Financial Crisis." *Journal of International Economics* 51 (1): 169–94.
- Contessi, Silvio, Pierangelo DePace, and Johanna Francis. 2008. "The Cyclical Properties of Disaggregated Capital Flows." Working Paper 2008-041, Federal Reserve Bank of St. Louis.
- Corsetti, Giancarlo, Paolo Pesenti, and Nouriel Roubini. 1999. "What Caused the Asian Currency and Financial Crisis?" *Japan and the World Economy* 11 (3): 305–73.

- Crockett, Andrew. 2000. "Marrying the Micro- and Macro-Prudential Dimensions of Financial Stability." Remarks before the Eleventh International Conference of Banking Supervisors, Basel, September 20–21.
- de Larosière Group. 2009. "The High-Level Group on Financial Supervision in the EU." de Larosière Group, Brussels, February 25.
- Eichengreen, Barry, and Ricardo Hausmann. 2003. "Original Sin: The Road to Redemption." In *Other People's Money: Debt Denomination and Financial Instability in Emerging Market Economies*, ed. Barry Eichengreen and Ricardo Hausmann. Chicago: University of Chicago Press.
- Eichengreen, Barry, Ricardo Hausmann, and Ugo Panizza. 2003. "Currency Mismatches, Debt Intolerance, and Original Sin: Why They Are Not the Same and Why It Matters." NBER Working Paper 10036, National Bureau of Economic Research, Cambridge, MA.
- Financial Stability Board. 2009. *Progress since the Pittsburgh Summit in Implementing the G20 Recommendations for Strengthening Financial Stability*. Report of the Financial Stability Board to G-20 Finance Ministers and Governors. Basel: Financial Stability Board.
- FSA (Financial Services Authority). 2009. "A Regulatory Response to the Global Banking Crisis." Discussion Paper 09/2, Financial Services Authority, London, March.
- Goldstein, Morris, and Philip Turner. 2004. "Currency Mismatches at Center of Financial Crises in Emerging Economies." Peterson Institute for International Economics, Washington, DC.
- Gosh, Swati. 2006. *East Asian Finance: The Road to Robust Markets*. Washington, DC: World Bank.
- Huang, Yiping. 2009. "Strategies for Asian Exchange Rate Policy Cooperation." Paper presented to the conference "Asian Economic Integration: Financial and Macroeconomic Issues," Institute of World Politics and Economics, Institute of Asia Pacific, Chinese Academy of Social Sciences, and East Asia Bureau of Economic Research, Beijing, May 14–15.
- IMF (International Monetary Fund). 2008. *World Economic Outlook Update: Rapidly Weakening Prospects Call for New Policy Stimulus*. Washington, DC: IMF, November.
- . 2009a. "The Perimeter of Financial Regulation." IMF Staff Position Note SPN/09/07, IMF, Washington, DC, March 26.
- . 2009b. *World Economic Outlook: Crisis and Recovery*. Washington, DC: IMF, April.
- . 2010. *World Economic Outlook: Rebalancing Growth*. Washington, DC: IMF, April.
- Kaminsky, Graciela L., Carmen M. Reinhart, and Carlos A. Vegh. 2004. "When It Rains, It Pours: Pro-Cyclical Capital Flows and Macroeconomic Policies." NBER Working Paper 10780, National Bureau of Economic Research, Cambridge, MA.
- Park, Yung Chul. 2009. "Global Economic Recession and East Asia: How Has Korea Managed the Crisis and What Has It Learned?" Bank of Korea Working Paper 209, Institute for Monetary and Economic Research, Seoul, November.
- Rodrik, Dani, and Andres Velasco. 1999. "Short-Term Capital Flows." In *Annual World Bank Conference on Development Economics 1999*. Washington, DC: World Bank.
- Warwick Commission on International Financial Reform. 2009. "In Praise of Unlevel Playing Fields." University of Warwick, U.K.
- White, William. 2004. "Making Macroprudential Concerns Operational." Speech delivered at the "Financial Stability Symposium," Netherlands Bank, Amsterdam, October 25–26.
- World Bank. 2007. "Will Resilience Overcome Risk?" East Asia and Pacific Update, World Bank, Washington, DC, November.