Global Financial Instability: Framework, Events, Issues

Frederic S. Mishkin

Frederic S. Mishkin is A. Barton Hepburn Professor of Economics, Graduate School of Business, Columbia University and Research Associate, National Bureau of Economic Research, Cambridge, Massachusetts.

In the last five years, the global economy has experienced severe bouts of financial instability that have had devastating impacts on crisis countries such as Mexico (in which GDP growth fell from above 4 percent in 1994 before the crisis to negative 6 percent in 1995) and in Thailand, Malaysia, South Korea and Indonesia (in which GDP growth fell from above 5 percent in 1996 before the crisis to below -5 percent in 1998, see Table 1). These swings of GDP growth of over 10 percent are on the order of magnitude to what occurred in the United States during the Great Depression.

Two of the key questions facing policymakers today are how to reduce the risk of global financial stability, and how to cope with it when it occurs. This paper starts by defining financial instability and then showing how it harms economic activity. It then uses this framework to describe what happened during the recent financial crises in Mexico and east Asia. The paper ends by raising several key policy issues; not coincidentally, these issues are addressed in the remaining papers in the symposium.

What Is Financial Instability?

Financial markets perform the essential function of channeling funds to those individuals or firms that have productive investment opportunities. If the financial system does not perform this role

well, then the economy cannot operate efficiently and economic growth will be hampered. This function implies a capability of making judgements about which investment opportunities are more or less creditworthy. Thus, a financial system must struggle with problems of asymmetric information, in which one party to a financial contract has much less accurate information than the other party. For example, borrowers who take out loans usually have better information about the potential returns and risk associated with the investment projects they plan to undertake than lenders do. Asymmetric information leads to two basic problems in the financial system (and elsewhere): adverse selection and moral hazard.

Adverse selection occurs before the financial transaction takes place, when potential bad credit risks are the ones who most actively seek out a loan. For example, those who want to take on big risks are likely to be the most eager to take out a loan, even at a high rate of interest, because they are less concerned with paying the loan back. Thus, the lender must be concerned that the parties who are the most likely to produce an undesirable or adverse outcome are most likely to be selected as borrowers. This outcome is a feature of the classic "lemons problem" analysis first described by Akerlof (1970). In that example, partially informed buyers of used cars may steer away from purchasing a car at the lowest price, because they know that they are not fully informed about quality, and they fear that a low-price car may also be a low-quality car. In the case of capital markets, partially informed lenders may steer

away from making loans at high interest rates, because they know that they are not fully informed about the quality of borrowers, and they fear that someone willing to borrow at a high interest rate is more likely to be a low-quality borrower who is less likely to repay the loan. Lenders will try to tackle the problem of asymmetric information by screening out good from bad credit risks. But this process is inevitably imperfect, and fear of adverse selection will lead lenders to reduce the quantity of loans they might otherwise make.

Moral hazard occurs after the transaction takes place. It occurs because a borrower has incentives to invest in projects with high risk in which the borrower does well if the project succeeds, but the lender bears most of the loss if the project fails. A borrower also has incentives to misallocate funds for personal use, to shirk and not work very hard, and to undertake investment in unprofitable projects that serve only to increase personal power or stature.

Thus, a lender subjected to the hazard that the borrower has incentives to engage in activities that are undesirable from the lender's point of view: that is, activities that make it less likely that the loan will be paid back. Lenders do often impose restrictions (restrictive covenants) on borrowers so that borrowers do not engage in behavior that makes it less likely that they can pay back the loan. However, such restrictions are costly to enforce and monitor, and inevitably somewhat limited in their reach. The

potential conflict of interest between the borrower and lender stemming from moral hazard again implies that many lenders will lend less than they otherwise would, so that lending and investment will be at suboptimal levels.

In the last 20 years, a growing literature has sought to explain the institutional structure of financial markets by recognizing that this structure has evolved to reduce the asymmetric information problems of adverse selection and moral hazard (Gertler, 1988 and Bernanke, Gertler and Gilchrist, 1998). Of course, addressing the problems of asymmetric information is not a one-time event, but rather an ongoing problem whose dimensions shift with each twist and turn of the economy. From this perspective, the underlying rationale for financial intermediaries (commercial banks, thrift institutions, finance companies, insurance companies, mutual funds and pension funds), of which banks are the most important, is that they have both the ability and the economic incentive to address asymmetric information problems. For example, banks have an obvious ability to collect information at the time they consider making a loan, and this ability is only increased when banks engage in long-term customer relationships and line of credit arrangements. In addition, their ability to scrutinize the checking account balances of their borrowers provides banks with an additional advantage in monitoring the borrowers' behavior. Banks also have advantages in reducing moral hazard because, as demonstrated by Diamond (1984), they can engage in lower cost monitoring than

individuals, and because, as pointed out by Stiglitz and Weiss (1983), they have advantages in preventing risk taking by borrowers since they can use the threat of cutting off lending in the future to improve a borrower's behavior. Banks' natural advantages in collecting information and reducing moral hazard explain why banks have such an important role in financial markets throughout the world. Indeed, the greater difficulty of acquiring information on private firms in emerging market countries explains why banks play a more important role in the financial systems in emerging market countries than they do in industrialized countries (Rojas-Suarez and Weisbrod, 1994).

Banks have an incentive to collect and produce such information because they make private loans that are not traded, which reduces free rider problems. In markets for other securities, like stocks, if some investors acquire information that screens out which stocks are undervalued and then they buy these securities, other investors who have not paid to discover this information may be able to buy right along with the well-informed investors. If enough free-riding investors can do this and the price is bid up, then investors who have collected information will earn less on the securities they purchase and will thus have less incentive to collect this information. Once investors recognize that other investors in securities can monitor and enforce restrictive covenants, they will also want to free ride on the other investors' monitoring and enforcement. As a result, not enough resources will be devoted to

screening, monitoring and enforcement. But because the loans of banks are private, other investors cannot buy the loans directly, and free-riding on banks' restrictive covenants is much trickier than simply following the buying patterns of others. As a result, investors are less able to free ride off of financial institutions making private loans like banks, and since banks receive the benefits of screening and monitoring they have an incentive to carry it out.

Focusing on information problems leads to a definition of financial instability: Financial instability occurs when shocks to the financial system interfere with information flows so that the financial system can no longer do its job of channeling funds to those with productive investment opportunities. Indeed, if the financial instability is severe enough, it can lead to almost a complete breakdown in the functioning of financial markets, a situation which is then classified as a financial crisis.

Why Financial Instability Occurs

Financial intermediaries, and particularly banks, have a very important role in financial markets since they are well suited to engage in information-producing activities that facilitate productive investment for the economy. Thus, a decline in the ability of these institutions to engage in financial intermediation and to make loans will lead directly to a decline in investment and

aggregate economic activity. When shocks to the financial system make adverse selection and moral hazard problems worse, then lending tends to dry up --- even for many of those with productive investment opportunities, since it has become harder to distinguish them from potential borrowers who do not have good opportunities. The lack of credit leads individuals and firms to cut their spending, resulting in a contraction of economic activity that can be quite severe. Four factors can lead to increases in asymmetric information problems and thus to financial instability: deterioration of financial sector balance sheets, increases in interest rates, increases in uncertainty, and deterioration of nonfinancial balance sheets due to changes in asset prices. I will discuss each in turn.

Deterioration in Financial Sector Balance Sheets

If banks (and other financial intermediaries making loans) suffer a deterioration in their balance sheets, and so have a substantial contraction in their capital, they have two choices: either they can cut back on their lending; or they can try to raise new capital. However, when banks experience a deterioration in their balance sheets, it is very hard for them to raise new capital at a reasonable cost. Thus, the typical response of banks with weakened balance sheets is a contraction in their lending, which slows economic activity. Recent research suggests that weak balance sheets led to a capital crunch which hindered growth in the U.S.

economy during the early 1990s (e.g., see the symposium published in Federal Reserve Bank of New York, 1993).

If the deterioration in bank balance sheets is severe enough, it can even lead to bank panics, in which there are multiple, simultaneous failures of banking institutions. Indeed, in the absence of a government safety net, there is some risk that contagion can spread from one bank failure to another, causing even healthy banks to fail. The source of the contagion is again asymmetric information. In a panic, depositors, fearing the safety of their deposits and not knowing the quality of the banks' loan portfolios, withdraw their deposits from the banking system, causing a contraction in loans and a multiple contraction in deposits, which then causes other banks to fail. In turn, the failure of a bank means the loss of the information relationships in which that bank participated, and thus a direct loss in the amount of financial intermediation that can be done by the banking sector. The outcome is an even sharper decline in lending to facilitate productive investments, with an additional resulting contraction in economic activity.

Increases in Interest Rates

Asymmetric information and the resulting adverse selection problem can lead to "credit rationing," in which some borrowers are denied loans even when they are willing to pay a higher interest rate (Stiglitz and Weiss, 1981). This occurs because as interest

rates rise, prudent borrowers are more likely to decide that it would be unwise to borrow, while borrowers with the riskiest investment projects are often those who are willing to pay the highest interest rates, since if the high-risk investment succeeds, they will be the main beneficiaries. In this setting, a higher interest rate leads to even greater adverse selection; that is, the higher interest rate increases the likelihood that the lender is lending to a bad credit risk. Thus, higher interest rates can be one factor that helps precipitate financial instability, because lenders recognize that higher interest rates mean a dilution in the quality of potential borrowers, and are likely to react by taking a step back from their business of financial intermediation and limiting the number of loans they make.

Increases in interest rates can also have a negative effect on bank balance sheets. The traditional banking business involves "borrowing short and lending long;" that is, taking deposits which can be withdrawn on demand (or certificates of deposit that can be withdrawn in a matter of months) and making loans that will be repaid over periods of years or sometimes even decades. In short, the assets of a bank typically have longer duration assets than its liabilities. Thus, a rise in interest rates directly causes a decline in net worth, because in present value terms, the interest-rate rise lowers the value of assets with their longer duration more than it raises the value of liabilities with their shorter duration.

Increases in Uncertainty

A dramatic increase in uncertainty in financial markets makes it harder for lenders to screen out good from bad credit risks. The lessened ability of lenders to solve adverse selection and moral hazard problems renders them less willing to lend, leading to a decline in lending, investment, and aggregate activity. This increase in uncertainty can stem from a failure of a prominent financial or nonfinancial institution, or from a recession, or from uncertainty about the future direction of government policies.

Deterioration of Nonfinancial Balance Sheets

The state of the balance sheet of nonfinancial firms is the most critical factor for the severity of asymmetric information problems in the financial system. If there is a widespread deterioration of balance sheets among borrowers, it worsens both adverse selection and moral hazard problems in financial markets, thus promoting financial instability. This problem can arise in a variety of ways.

For example, lenders often use collateral as an important way of addressing asymmetric information problems. Collateral reduces the consequences of adverse selection or moral hazard because it reduces the lender's losses in the case of a default. If a borrower defaults on a loan, the lender can sell the collateral to make up for at least some of the losses on the loan. But if asset prices in

an economy fall, and the value of collateral falls as well, then the problems of asymmetric information suddenly rear their heads.

Net worth can perform a similar role to collateral. If a firm has high net worth, then even if it defaults on its debt payments, the lender can take title to the firm's net worth, sell it off, and use the proceeds to recoup some of the losses from the loan. High net worth also directly decreases the incentives for borrowers to commit moral hazard because borrowers now have more at stake, and thus more to lose, if they default on their loans. The importance of net worth explains why stock market crashes can cause financial instability. A sharp decline in the stock market reduces the market valuation of a firms' net worth, and thus can increase adverse selection and moral hazard problems in financial markets (Greenwald and Stiglitz, 1988; Bernanke and Gertler, 1989; Calomiris and Hubbard, 1990). Since the stock market decline which reduces net worth increases incentives for borrowers to engage in moral hazard, and since lenders are now less protected against the consequences of adverse selection because the value of net assets is worth less, lending decreases and economic activity declines.

Increases in interest rates not only have a direct effect on increasing adverse selection problems, as described a moment ago, but they may also promote financial instability through both firms' and households' balance sheets. A rise in interest rates will increased households' and firms' interest payments, decrease cash flow and thus cause a deterioration in their balance sheets, as

pointed out in Bernanke and Gertler's (1995) excellent survey of the credit view of monetary transmission. As a result, adverse selection and moral hazard problems become more severe for potential lenders to these firms and households, leading to a decline in lending and economic activity. There is thus an additional reason why sharp increases in interest rates can be an important factor leading to financial instability.

Unexpected changes in the rate of inflation can also affect balance sheets of borrowers. In economies in which inflation has been moderate for a long period of time, debt contracts with long duration have interest payments fixed in nominal terms for a substantial period of time. When inflation turns out to be less than anticipated, which can occur either because of an unanticipated disinflation as occurred in the United States in the early 1980s or by an outright deflation as has occurred in Japan more recently, the value of firms' liabilities in real terms rises, and its net worth in real terms declines. The reduction in net worth then increases the adverse selection and moral hazard problems facing lenders, and reduces investment and economic activity.

In emerging market economies, a decline in unanticipated inflation does not have the unfavorable direct effect on firms' balance sheets that it has in industrialized countries. Debt contracts are of very short duration in many emerging market countries, and since the terms of debt contracts are continually repriced to reflect expectations of inflation, unexpected inflation

has little real effect. Thus, one mechanism that has played a role in industrialized countries to promote financial instability has no role in many emerging market countries.

On the other hand, emerging market economies face at least one factor affecting balance sheets that can be extremely important in precipitating financial instability that is not important in most industrialized countries: unanticipated exchange rate depreciation or devaluation. Because of uncertainty about the future value of the domestic currency, many nonfinancial firms, banks and governments in emerging market countries find it much easier to issue debt if the debt is denominated in foreign currencies. With debt contracts denominated in foreign currency, when there is an unanticipated depreciation or devaluation of the domestic currency, the debt burden of domestic firms increases. Since assets are typically denominated in domestic currency and so do not increase in value, there is a resulting decline in net worth. This deterioration in balance sheets then increases adverse selection and moral hazard problems, which leads to financial instability and a sharp decline in investment and economic activity. A substantial amount of debt denominated in foreign currency was a prominent feature of the institutional structure in Chilean financial markets before its financial crisis in 1982, in Mexico in 1994 and in East Asia in 1997.

Financial Instability in Mexico and East Asia

The recent Mexican and east Asian crises offer vivid illustrations of how financial crises grow from problems of asymmetric information.[1] This section will discuss some basic facts about these economies which provide clues as to what might explain these crises and what cannot explain them.[2] The next section will then examine the sequence of events in these crises.

1. At the onset of the crises, fiscal deficits were not a serious problem in the crisis countries. In 1996, before the financial crisis hit, all of the East Asian crisis countries had fiscal surpluses before the crisis, as shown in Table 2. In 1997, only Thailand developed a small deficit. In 1994, Mexico's government was running only a small deficit. These data strongly

[1]This paper does not examine two other recent crises, those in Brazil and Russia. Russia's financial crisis in 1998 can also be explained with the asymmetric information story here, but it is more appropriate to view it as a symptom of a wider breakdown in the economy -- and discussing the myriad problems of the Russian economy would take us too far afield. The Brazilian crisis differs in that it has features of a more traditional balance of payments crisis, in which fiscal policy plays a prominent role, rather than a financial crisis. The paper also does not examine what is happening in Japan. Japan has also been experiencing financial instability with a banking crisis that is having serious negative impact on the economy. The asymmetric information framework can also illuminate the stagnation in Japan, but because Japan has not entered a full-fledged financial crisis, it is not discussed here. However, see Mishkin (forthcoming). The Chilean financial crisis of 1982 also is well-explained by the asymmetric information framework outlined here and is discussed in Diaz-Alejandro (1985).

[2]Surveys of the basic facts in the Mexican and East Asian crises can be found in Mishkin (1996, 1999), Goldstein (1998), Radelet and Sachs (1998), Corsetti, Pesenti and Roubini (1998), World Bank (1998), and Kamin (1999).

suggest that inappropriate fiscal policy was not the source of the currency or financial crises in these countries.

2. At the onset of the crises, inflation was relatively low in all the crisis countries. In 1994, Mexican inflation was below 10 percent, and had declined substantially from previous levels. Similarly, as we can see in Table 2, right before the crisis, inflation rates in East Asia were below 10 percent and were sometimes below 5 percent. These first two facts suggests that monetary and fiscal policy were in general quite reasonable in these countries before the crises.

3. The experience of the crisis countries in terms of the appreciation of their real exchange rates before the crises were somewhat mixed. In the three-year period leading up to the crises, some of countries that would experience the crises saw little or no real appreciation of their currencies. South Korea had a very slight real depreciation, Indonesia and Malaysia real appreciation less than 5 percent, and Thailand, the Philippines and Mexico real appreciations of between 5 and 10 percent. Thus, although an earlier real appreciation of the exchange rate might have played a role in the Thai, Philippines and Mexican crises, it is not as clear that real appreciation was an important factor in the crises in the other countries.

4. The crisis countries, for the most part, were experiencing large current account deficits. In 1994, Mexico had a current account deficit (the difference between exports and imports of goods

and services) of 7 percent of GDP. In 1996, the east Asian crisis countries of Malaysia, Indonesia, the Philippines and South Korea had current account deficits between 3 percent and 5 percent of GDP, while Thailand was running a deficit of 8 percent of GDP. These large current account deficits are likely to have played some role in the subsequent crises these countries experienced.

5. Capital inflows into the crisis countries were very high before the crisis and turned around rapidly at the outset of the crisis. As Table 2 indicates, capital inflows relative to GDP were very high in all the crisis countries before the crisis, ranging from 5 percent to 14 percent of GDP. When the crises occurred, capital flows underwent a huge reversal and started flowing outward. Whether the capital outflows were a cause or a symptom of the financial crises in these countries is an important question.

6. Lending booms, in which bank lending grew at very rapid rates, occurred in all crisis countries before the crisis. For the three year period from 1991-94, credit growth in the Mexican banking sector averaged over 20 percent per year. In the east Asian crisis countries, from 1993-96 credit growth in the banking sector averaged between 17 percent and 30 percent per year. A focus on the banking sector may understate the overall growth in credit, since as Corsetti, Pesenti and Roubini (1998) point out in the case of Thailand, the growth in lending was far higher for finance companies and other nonbank financial institutions than it was for banks. Lending booms thus look like they could have been an important

factor causing problems in the financial sector, which is consistent with the evidence in Gavin and Hausman (1996) and Kaminsky and Reinhart (1996) who find in general that lending booms are an important predictor of banking crises.

7. Deterioration in bank balance sheets occurred before the crises in all crisis countries. At the onset of the crises, nonperforming loans as a percentage of total bank loans was already high in all the crisis countries. Table 2 provides figures for nonperforming loans shortly after the crisis. Thailand, Indonesia, South Korea and Mexico all had nonperforming loans that exceeded 10 percent of total bank lending, while Malaysia and the Philippines had nonperforming loans between 5 and 10 percent of total bank lending. (As a comparison, in the United States currently, nonperforming loans are on the order of 1 percent of total bank loans. These figures for Mexico and the East Asian countries are likely to be substantially understated because accounting principles for nonperforming loans in emerging market countries are far more lax than in the United States.) The deterioration in bank balance sheets before the crises in consistent with an argument that problems in the financial sector were at the root of the subsequent financial crises in these countries.

8. Crisis countries were highly illiquid before the crisis. The ratio of short-term debt denominated in foreign currencies to central bank reserves of foreign currencies was high in all the crisis countries at the onset of the crisis. A high value of this

ratio suggests limited liquid resources for a country to meet its short-term obligations. In June 1997, Thailand, Indonesia and South Korea had exceptionally high levels of this ratio, of 1.5 or greater, while it was between 0.5 and 1.0 in the Philippines and Malaysia. In November 1994, right before its crisis, this ratio was 2.6 for Mexico. Another measure of illiquidity is the ratio of broad money (M2) to central bank reserves of other currencies. A high value for this ratio indicates vulnerability to domestic residents running from deposits into foreign currency if they become concerned that a depreciation of the currency may be in the works, since the central bank will not have sufficient reserves to cover the exchange of domestic deposits for foreign currency. In June 1997, the ratio of M2 to reserves exceeded 6 for Indonesia and South Korea, was between 4 and 5 in Thailand, Malaysia and the Philippines. For Mexico, right before its crisis in November 1994, this ratio was 9.0. The high degree of illiquidity in these countries suggests that they were vulnerable to a financial crisis (Radelet and Sachs, 1998).

The Sequence of Events in the Financial Crises of Mexico and East Asia

If an explanation of financial crisis is to be convincing, it must begin at the beginning and go on to the end. But what event should serve as the beginning of the crises in East Asia and Mexico.

Macroeconomic fundamentals are not a likely candidate. Inflation and budget deficits were low. The record of currency appreciation was mixed, and did not seem sufficient to bring on a crisis. It is true that substantial current account deficits were a feature of the economies that were later to experience a crisis and thus may have had some role. The large net capital inflows were also accompanied by lending booms and a deterioration of bank balance sheets. The consensus from many empirical studies, as discussed in the survey by Kaminsky, Lizondo and Reinhart (1997), is that current account measures do not have predictive power for financial crises, while illiquidity and problems in the banking sector do. Therefore, it makes sense to begin with influences on the domestic financial and banking sectors of these countries.

The First Stage: The Runup to the Currency Crisis

In the late 1980s and into the 1990s, Mexico and the countries of east Asia carried out a financial liberalization, which involved lifting restrictions on both interest-rate ceilings and the type of lending allowed. Lending increased dramatically, fed by inflows of international capital.

Of course, the problem was not that lending expanded, but rather that it expanded so rapidly that excessive risk-taking was the result. This excessive risk-taking occurred for two reasons. First, banks and other financial institutions lacked the well-trained loan officers, risk-assessment systems, and other management

expertise to evaluate and respond to risk appropriately. This problem was made even more severe by the rapid credit growth in a lending boom which stretched the resources of the bank supervisors. They failed to screen and monitor these new loans appropriately. Second, Mexico and the crisis countries in east Asia were notorious for weak financial regulation and supervision. (In contrast, the noncrisis countries in east Asia, Singapore, Hong Kong and Taiwan had very strong prudential supervision.) When financial liberalization yielded new opportunities to take on risk, these weak regulatory/supervisory systems could not limit the moral hazard created by the government safety net, and excessive risk-taking was one result. Even as government failed in supervising banks, it was effectively offering an implicit safety net that banks would not be allowed to go broke, and thus reassuring depositors and foreign lenders that they did not need to monitor these banks, since there were likely to be government bailouts to protect them.

A dangerous dynamic emerged. Once financial liberalization was adopted, foreign capital flew into banks in these emerging market countries because they paid high yields in order to attract funds to rapidly increase their lending, and because such investments were viewed as likely to be protected by a government safety net, either from the government of the emerging market country or from international agencies such as the IMF. The capital inflow problem was further stimulated by government policies of keeping exchange rates pegged to the dollar, which probably gave foreign investors a

sense of lower risk. Indeed, one lesson that emerges from the financial crises of the last few years is that pegging exchange rates has a hidden cost because it may encourage excessive risk-taking and capital inflows (Mishkin, 1998). As noted earlier, Mexico and across east Asia capital inflows averaged was over 5 percent of GDP in the three years leading up to the crisis. The private capital inflows led to increases in the banking sector, especially in the emerging market countries in the Asian-Pacific region (Folkerts-Landau et al., 1995). The capital inflows fueled a lending boom which led to excessive risk-taking on the part of banks, which in turn led to huge loan losses and a subsequent deterioration of banks' and other financial institutions' balance sheets.

This deterioration in bank balance sheets, by itself, might have been sufficient to drive these countries into a financial and economic crises. As explained earlier, a deterioration in the balance sheets of banking firms can lead them at a minimum to restrict their lending, or can even lead to a full-scale banking crisis which forces many banks into insolvency, thereby nearly removing the ability of the banking sector to make loans. The resulting credit crunch can stagger an economy.

Stock market declines and increases in uncertainty were additional factors precipitating the full-blown crises in Mexico, Thailand and South Korea. (The stock market declines in Malaysia, Indonesia and the Philippines occurred simultaneously with the onset of the crisis.) The Mexican economy was hit by political shocks in

1994 that created uncertainty, specifically the assassination of Luis Donaldo Colosio, the ruling party's presidential candidate, and an uprising in the southern state of Chiapas. By the middle of December 1994, stock prices on the Bolsa (stock exchange) had fallen nearly 20 percent from their September 1994 peak. In January 1997, a major Korean chaebol (conglomerate), Hanbo Steel, collapsed; it was the first bankruptcy of a chaebol in a decade. Shortly thereafter, Sammi Steel and Kia Motors also declared bankruptcy. In Thailand, Samprosong Land, a major real estate developer, defaulted on its foreign debt in early February 1997, and financial institutions that had lent heavily in the real estate market began to encounter serious difficulties, requiring over $8 billion of loans from the Thai central bank to prop them up. Finally, in June, the failure of a major Thai finance company, Finance One, imposed substantial losses on both domestic and foreign creditors. These events increased general uncertainty in the financial markets of Thailand and South Korea, and both experienced substantial declines in their securities markets. From peak values in early 1996, Korean stock prices fell by 25 percent and Thai stock prices fell by 50 percent.

As we have seen, an increase in uncertainty and a decrease in net worth as a result of a stock market decline increase asymmetric information problems. It became harder to screen out good from bad borrowers, and the decline in net worth decreased the value of firms' collateral and increased their incentives to make risky

investments because there is less equity to lose if the investments are unsuccessful. The increase in uncertainty and stock market declines that occurred before the crisis, along with the deterioration in banks' balance sheets, worsened adverse selection and moral hazard problems and made the economies ripe for a serious financial crisis.

In an industrialized countries, when a financial crises occurs and the financial system threatens to seize up, domestic central banks can address matters with expansionary monetary policy to make credit more broadly available and with a lender of last resort operation to limit the degree of instability in the banking system.[3] However, in emerging markets, where the credibility of the central bank as an inflation-fighter may be in doubt and debt contracts are typically short-term and in foreign currencies, expansionary monetary policy and lender-of-last-resort becomes a two-edged sword -- as likely to exacerbate the financial crisis as to alleviate it.

In emerging economies, since the central bank rarely has much of an inflation-fighting reputation, using expansionary monetary policy is likely to cause expected inflation to rise dramatically, thus pushing nominal interest rates up and causing the domestic currency to depreciate sharply. In turn, this leads to a double-whammy in which interest payments on foreign debt are higher both

[3] See Mishkin (1991) for a discussion of how expansionary monetary policy and a lender of last resort operation in industrialized countries can work to keep asymmetric information problems from getting out of control, thereby promoting economic recovery.

because of the higher short-term nominal interest rates and because of the currency depreciation -- all of which leads to a further deterioration in firms' and banks' balance sheets. Thus, in an emerging economy, expansionary monetary policy may simply amplify the adverse selection and moral hazard problems in financial markets caused by a financial crisis.

For similar reasons, a central bank in an emerging market economy which attempts to serve the lender-of-last-resort function may not be as successful. When the U.S. Federal Reserve has engaged in a lender-of-last-resort operation, as it did during the 1987 stock market crash, there was almost no sentiment in the markets that it would lead to substantially higher inflation. However, for a central bank with less inflation-fighting credibility, central bank lending to the financial system in the wake of a financial crisis -- even under the rhetoric of lender-of-last-resort -- may well arouse fears of inflation spiraling out of control, with the attendant effects of higher nominal interest rates, currency depreciation, and still greater deterioration of balance sheets.

The known weakness of the central bank in responding to a financial crisis creates vulnerability for a currency crisis. A weak banking system makes it less likely that the central bank will take the steps to defend a domestic currency, which means that expected profits from selling the currency have now risen. For example, the central bank in a country with a weakened banking system will fear raising interest rates, because any rise in interest rates to keep

the domestic currency from depreciating has the additional effect of weakening the banking system, as explained earlier. Thus, when a speculative attack on the currency occurs in an emerging market country (in which speculators sell large amounts of the domestic currency for foreign currency), if the central bank raises interest rates sufficiently to defend the currency, the banking system may collapse. The government may also fear that the cost of bailing out the insolvent banking sector could produce substantial fiscal deficits (Burnside, Eichenbaum and Rebelo 1998), so it will discourage any actions which would cause banks to be declared officially broke.

The weakened state of the banking sector along with the high degree of illiquidity in Mexico and East Asian countries before the crisis, then set the stage for the currency crisis. With these vulnerabilities, speculative attacks on the currency could have been triggered by a variety of factors. In the Mexican case, the attacks came in the wake of political instability in 1994 such as the assassination of political candidates and an uprising in Chiapas. Even though the Mexican central bank intervened in the foreign exchange market and raised interest rates sharply, it was unable to stem the attack and was forced to devalue the peso on December 20, 1994. In Thailand, the attacks followed unsuccessful attempts of the government to shore up the financial system, culminating in the failure of Finance One. Eventually, the inability of the central bank to defend the currency because the required measures would do

too much harm to the weakened financial sector meant that the attacks could not be resisted. The outcome was therefore a collapse of the Thai baht in early July 1997. Subsequent speculative attacks on other Asian currencies led to devaluations and floats of the Philippine peso and Malaysian ringgit in mid-July, the Indonesian rupiah in mid-August and the Korean won in October. By early 1998, the currencies of Thailand, the Philippines, Malaysia and Korea had fallen by over 30 percent, with the Indonesian rupiah falling by over 75 percent.

The Second Stage: From Currency Crisis to Financial Crisis

Particular features of the typical debt contracts in Mexico and East Asia helped turn the currency crisis into a full-fledged financial crisis: the short duration of debt contracts and their denomination in foreign currencies. These features of debt contracts generated three mechanisms through which the currency crises increased asymmetric information problems in credit markets, thereby causing a financial crisis to occur.

The first mechanism involved the direct effect of currency devaluation on the balance sheets of firms. As discussed earlier, the devaluations in Mexico and East Asia increased the debt burden of domestic firms which were denominated in foreign currencies. This mechanism was particularly strong in Indonesia, the worst hit of all the crisis countries, which saw the value of its currency decline by over 75 percent, thus increasing the rupiah value of foreign-

denominated debts by a factor of four. Even a healthy firm is likely to be driven into insolvency by such a shock if it had a significant amount of foreign-denominated debt.

A second mechanism linking the financial crisis and the currency crisis arose because the devaluation of the domestic currency led to further deterioration in the balance sheets of the banking sector, provoking a large-scale banking crisis. In Mexico and the east Asian countries, banks had many liabilities denominated in foreign currency which increased sharply in value when a depreciation occurs. On the other hand, the problems of firms and households meant that they were unable to pay off their debts, also resulting in loan losses on the assets side of the banks' balance sheets. The result is that banks' balance sheets were squeezed from both the assets and liabilities side. Moreover, many of the banks' foreign-currency denominated debt was very short-term, so that the sharp increase in the value of this debt led to liquidity problems for the banks because this debt needed to be paid back quickly. The result of the further deterioration in bank balance sheets and their weakened capital base is that they cut back lending. In the case of Indonesia, these forces were severe enough to cause a banking panic in which numerous banks were forced to go out of business.

The third mechanism linking currency crises with financial crises in emerging market countries is that the devaluation can lead to higher inflation. The central bank in an emerging market country may have little credibility as an inflation fighter. Thus, a sharp

depreciation of the currency after a speculative attack that leads to immediate upward pressure on import prices, which can lead to a dramatic rise in both actual and expected inflation. This is exactly what happened in Mexico and Indonesia, where inflation surged to over a 50 percent annual rate after the currency crisis. (Thailand, Malaysia and South Korea avoided a large rise in inflation, which partially explains their better performance relative to Indonesia.) The rise in expected inflation after the currency crises in Mexico and Indonesia led to a sharp rise in nominal interest rates which, given the short-duration of debt, led to huge increases in interest payments by firms. The outcome was a weakening of firms' cash flow position and further weakening their balance sheets, which then increased adverse selection and moral hazard problems in credit market.

All three of these mechanisms indicate that the currency crisis caused a sharp deterioration in both financial and non-financial firm balance sheets in the crisis countries, which then translated to a contraction in lending and a severe economic downturn. Financial markets were then no longer able to channel funds to those with productive investment opportunities, which led to devastating effects on the economies of these countries.

Policy Issues

Promoting safety and soundness of the financial system is

crucial to preventing future financial instability. When a financial crisis does occur, the financial system needs to be restarted so that it can resume its job of channeling funds to those with productive investment opportunities. But what policy measures might governments adopt either to limit the risk of future financial crises or to cope with them after they arise? At the international level, there is the question of how an international institution might help cope with these crises, and prevent them from spreading. At the domestic level, a government might reform the regulation and supervision of its banking system to reduce the risk of lending that disregards prudent risks. Finally, various proposals have been made to slow down the flow of international capital movements, and thus prevent the extreme swings between inflows and outflows that contributed to the financial crises in Mexico and east Asia. The other three papers in the symposium take on these topics in turn, so here I will say only a few words about each.

Central banks in emerging market countries have only a very limited ability to extricate their countries from a financial crisis. As discussed earlier, if they attempt to use expansionary monetary policy to make credit more available, or employ a lender-of-last-resort policy, the risk is that they will set off currency depreciation, and possibly higher interest rates becaue of increases in expectations of future inflation, both of which will make matters worse. However, liquidity provided from foreign sources does not lead to these undesirable consequences, and it helps to stabilize

the value of the domestic currency which strengthens domestic balance sheets. Moreover, an international lender of last resort may be able to prevent contagion, in which a successful speculative attack on one emerging market currencies leads to attacks on other emerging market currencies, spreading financial and economic disruption as it goes. Since a lender of last resort for emerging market countries is needed at times, and since it cannot be provided domestically, there is a strong rationale for an international institution to fill this role. Indeed, since Mexico's financial crisis in 1994, the International Monetary Fund and other international agencies have stepped into the lender-of-last-resort role and provided emergency lending to countries threatened by financial instability.

However, an international lender of last resort brings risks of its own, especially the risk that if it is perceived as standing ready to bail out irresponsible financial institutions, it may lead to excessive risk-taking of the sort that makes financial crises more likely. An international lender of last resort must find ways to limit this moral hazard problem, or it can actually make the situation worse. Therefore, a key issue is what principles should guide international organizations in coping with global financial instability and whether the international agencies of today are up to the task. Kenneth Rogoff's paper and the article by Stanley Fischer, following this symposium, examine these issues.

At the domestic level, prevention of financial instability

requires of a strong regulatory/supervisory system to prevent excessive risk-taking on the part of financial institutions. This is the topic of Jerry Caprio and Patrick Honohan's paper on restoring banking stability. Caprio and Honohan examine the causes of widespread bank failures in emerging market countries. They focus on what policies can be used to ensure safety and soundness of the financial system. They outline why the conventional capital-adequacy focus of bank regulation and supervision will probably not be sufficient to ensure safety and soundness of the financial system, and what new approaches might be examined. These approaches must focus not only on incentives for bankers, but also on incentives for supervisors and bank claimants.

Finally, much discussion has focused on whether international capital movements should be viewed as a major contributing factor to global financial instability. The argument presented here suggests that although the fundamental underlying cause of financial instability is the presence of a government safety net with inadequate supervision of banking institutions, one mechanism through which the problem of instability becomes manifest is a vicious pendulum of capital inflows which lead to a lending boom and excessive risk-taking on the part of banks, followed by capital outflows. The dangers from capital flows thus raise the question of whether these flows should be regulated or limited in some way. Sebastian Edwards's paper examines this question and discusses the evidence on whether capital controls can be effective.

*I thank Brad DeLong and Alan Krueger and Tim Taylor for their helpful comments and Goetz von Peter for excellent research assistance. Any opinions expressed are those of the author and not those of Columbia University or the National Bureau of Economic Research.

References

Akerlof, George, "The Market for 'Lemons': Qualitative Uncertainty and the Market Mechanism," Quarterly Journal of Economics, August 1970, 84:3, 488-500.

Bernanke, Ben S. and Mark Gertler, "Agency Costs, Collateral, and Business Fluctuations", American Economic Review, 1989, 79: 14-31.

Bernanke, Ben S. and Mark Gertler, "Inside the Black Box: The Credit Channel of Monetary Policy Transmission," Journal of Economic Perspectives, Fall 1995, 9: 27-48.

Bernanke, Ben S., Gertler, Mark, and Simon Gilchrist. "The Financial Accelerator in a Quantitative Business Cycle Framework." NBER Working Paper 6455, March 1998.

Burnside, Craig, Eichenbaum, Martin and Sergio Rebelo, "Prospective Deficits and the Asian Currency Crisis," Federal Reserve Bank of Chicago, Working Paper-98-5, September 1998.

Calomiris, Charles W. and R. Glenn Hubbard, "Firm Heterogeneity, Internal Finance, and `Credit Rationing'", Economic Journal, 1990, 100: 90-104.

Corsetti, Giorgio., Pesenti, Paolo and Noriel Roubini, "What Caused the Asian Currency and Financial Crisis? Part I and II," NBER Working Papers, No. 6833 and 6844, 1998.

Diamond, Doug, "Financial Intermediation and Delegated

Monitoring", Review of Economic Studies, 1984, 51: 393-414.

Diaz-Alejandro, Carlos, "Good-Bye Financial Repression, Hello Financial Crash." Journal of Development Economics 1985, 19: 1-24.

Federal Reserve Bank of New York, "The Role of the Credit Slowdown in the Recent Recession," Federal Reserve Bank of New York Quarterly Review, Spring 1993, 18, #1.

Folkerts-Landau, David., Schinasi, Gary J., Cassard, M., Ng, V,K. Reinhart, Carmen M., and Spencer, M.G., "Effect of Capital Flows on the Domestic Financial Sectors in APEC Developing Countries," In: Khan, M.S. and Reinhart, C.M. (Eds.), Capital Flows in the APEC Region. International Monetary Fund. Wash. D.C., 1995: 31-57.

Gertler, Mark, "Financial Structure and Aggregate Economic Activity: An Overview", Journal of Money Credit and Banking, 1988, 20,2: 559-88

Gavin, Michael and Ricardo Hausman, "The Roots of Banking Crises: the Macroeconomic Context," In: Hausman Ricardo and Liliana Rojas-Suarez, (Eds.), Banking Crises in Latin America. Interamerican Development Bank and Johns Hopkins University Press. Baltimore. 1996: 27-63.

Goldstein, Morris, The Asian Financial Crisis. (Institute for International Economics. Wash. D.C., 1998)

Greenwald, Bruce and Joseph E. Stiglitz, "Information, Finance Constraints, and Business Fluctuations", in Kahn, M., and Tsiang, S.C. (eds) Oxford University Press, Oxford.

Kamin, Steven B., "The Current International Financial Crisis:

How Much is New? Journal of International Money and Finance, 1999, forthcoming.

Kaminsky, Graciela L. and Carmen M. Reinhart, "The Twin Crises: The Causes of Banking and Balance-of-Payments Problems" Board of Governors of the Federal Reserve System. International Finance Discussion Papers No. 544, 1996.

Kaminsky, Graciela L., Lizondo, S. and Carmen M. Reinhart, "Leading Indicators of Currency Crises. International Monetary Fund Working Paper WP/97/79, 1997.

Mishkin, Frederic S., Asymmetric Information and Financial Crises: A Historical Perspective. In: Hubbard, R.G. (Ed.) Financial Markets and Financial Crises. University of Chicago Press. Chicago. 1991: 69-108.

Mishkin, Frederic S, "Understanding Financial Crises: A Developing Country Perspective," Annual World Bank Conference on Development Economics: 1996: 29-62.

Mishkin, Frederic S., "The Dangers of Exchange-Rate Pegging in Emerging Market Countries." International Finance. 1998, 1 (1): 81-102.

Mishkin, Frederic S., "Lessons from the Asian Crisis," Journal of International Money and Finance, 1999, forthcoming.

Mishkin, Frederic S., "Promoting Japanese Recovery," in Kenichi Ishigaki and Hiroyuki Hino, eds., Towards the Restoration of Sound Banking Systems in Japan -- the Global Implications (Kobe University Press, forthcoming).

Radelet, Steven and Jeffrey Sachs, "The Onset of the East Asian Crisis." NBER Working Paper No. 6680, August 1998, Cambridge, MA: NBER.

Rojas-Suarez, Liliana and Steven R. Weisbrod, "Financial Market

Fragilities in Latin America: From Banking Crisis Resolution to Current Policy Challanges," IMF Working Paper WP/94/117, October 1994.

Stiglitz, Joseph E., and Andrew Weiss, "Credit Rationing in Markets with Imperfect Information", American Economic Review, 1981, 71: 393-410.

Stiglitz, Joseph E. and Andrew Weiss, "Incentive Effects of Terminations: Applications to Credit and Labor markets," American Economic Review, 1983, 73: 912-27.

World Bank, Global Economic Prospects, (Washington, D.C., 1998)